New Zealand
JOURNAL OF AGRICULTURE

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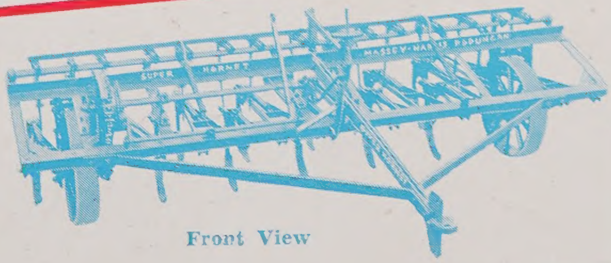
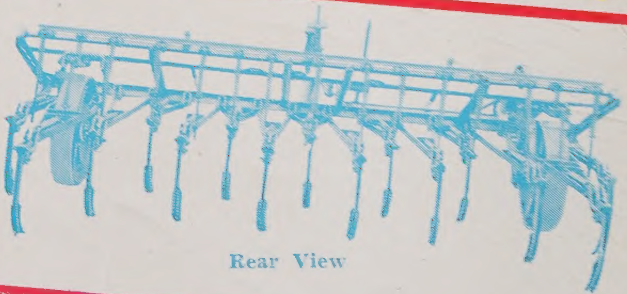


Front View



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NEW ZEALAND
JOURNAL OF AGRICULTURE

Vol. 71, No. 1. Published by Direction of Hon. B. Roberts, Minister of Agriculture. July 16, 1945.

British Farmers and War Effort

THE author of this article, Mr. G. A. Holmes, was leader of the group of New Zealand agriculturists loaned to the British Government to assist agricultural production in Great Britain during the war. He comments interestingly on the British farmers' wartime production effort.

WHEN Britain stood alone after the collapse of France in June, 1940, with Europe and a large part of North Africa occupied by the enemy, her shipping appeared an uncertain lifeline, menaced both from the air and from beneath the sea. Yet on this she depended for her imports of food, raw materials, and munitions. The strategy first of a defensive struggle, and then of widely extended and mounting offensive operations, was at all times viewed in relation to the availability of shipping. Agricultural policy was formulated so as to produce at home the maximum volume of food for direct human consumption.

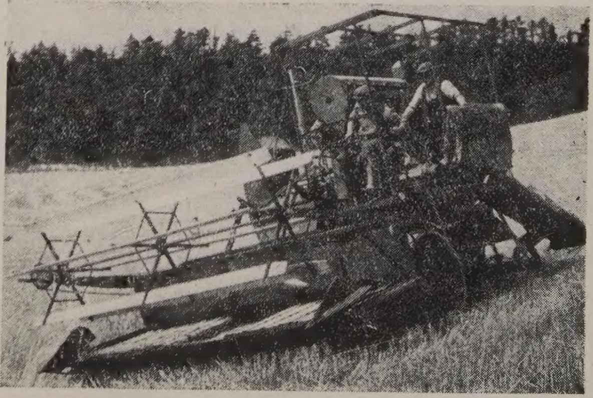
By 1943 the increased production from the land, coupled with the rationing system, had made it possible to reduce imports of food by 50 per cent. Nearly 7 million acres of old grassland had been ploughed up for grain, potatoes, sugar beet, flax, and vegetables, while additional forage crops had to be grown to offset the sharp curtailment in imports of animal feeding-stuffs.

Under the Defence Regulations sweeping powers were vested in the Minister of Agriculture authorising him to give directions as to the use of land, its cultivation and management, and in all matters incidental to such operations. These powers were delegated to County War Agricultural Executive Committees, comprised mainly of practical farmers with lengthy experience of local conditions, who gave their time voluntarily in the national interest. Their policy throughout was to secure the willing co-operation of the farmer, and there were relatively few cases where prosecution or dispossession became necessary.

In some counties the task of securing the ploughing quota must have appeared in 1939 as a most formidable one. A great deal of the land had been allowed to become almost derelict, and had reverted to a tough, matted turf of fine-leaved fescue and weeds dotted with thorn bushes or clumps of blackberry. Hedges were overgrown, encroaching a chain or more into the fields. Many fields were useless for cultivation until the ditches had been cleared and re-dug. Many farmers had "kept cows" by running them on this poor grassland, and feeding them heavily on purchased concentrates; they had neither a tractor nor a plough, nor sufficient area to warrant the purchase of either. On such holdings the War Committees were obliged to do all the cultivation, and perhaps the harvesting also, by contract. The low value of the old grassland is perhaps best indicated by the fact that, in spite of the ploughing up of more than one third of it, the numbers of cattle have actually been increased, as also has the production of milk.

Grain Crops

The area in wheat in 1943 was nearly 3½ million acres, more than double the average of the three years prior to 1939, and the highest recorded since the "Golden Age" of British farming in the early seventies of last century. The total acreage sown to grain reached more than 9½ million acres, the highest figure ever recorded. Barley is frequently grown following wheat, and is the most profitable grain crop on the light, sweet land overlying chalk. Oats is the only suitable cereal for a great deal of the cooler and wetter country of Wales, the North of England, and Scotland. Ryecorn, although never popular with British people as an ingredient of bread, provided a means of extending the cereal acreage by utilising sand or clay soils too acid for wheat.



This self-propelled combine harvester on a Hampshire farm illustrates British agriculturists' adoption of new labour-saving methods and increased use of machinery.

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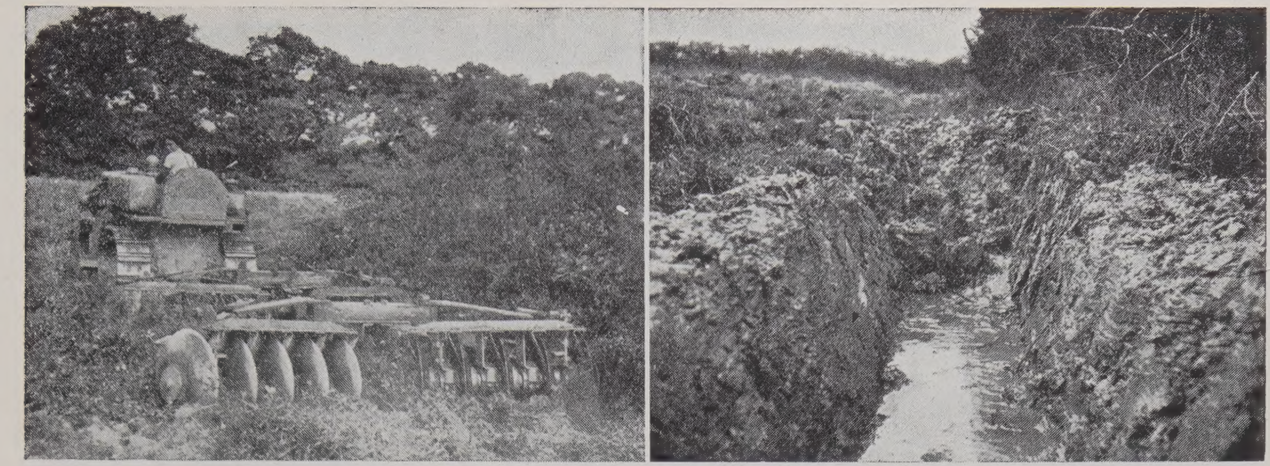


Left—Land Girl operating heavy machinery to prepare derelict ground for cropping. Right—Large areas of marshlands were useless until drained.

This remarkable expansion in grain-growing was achieved only by surmounting many difficulties in the supply of tractors, ploughs, drills, and other implements, harvesting machinery, and threshing mills.

Fertilisers were rationed, although on a reasonably liberal basis; corn sacks were used time after time; binder twine was for a time critically short. The farmers were assisted by schoolboys and volunteers from the towns, but such workers, although willing—even enthusiastic—were useful only for jobs requiring comparatively little skill. As header harvesters are in use only on the larger farms in the drier districts, most of the crops had to be stacked and the stacks thatched. It will be realised, therefore, that skilled labour at harvest time was essential. Added to all this, harvesting is made more difficult in many parts of Britain by broken weather, which seems to be the rule rather than the exception in the autumn months.

Potatoes

The area planted in potatoes in 1944 was nearly 1½ million acres, more than double the 1939 figure and the highest in the country's history. Wherever the land was at all suitable each farmer was directed to grow a certain acreage, and naturally this crop, with its heavy labour requirement, was not always popular. The grower received a subsidy at the rate of £10 per acre, which might be considered either as an insurance against loss of crop, or as meeting part of the rather heavy cost of "seed" potatoes. He was also assured of a market for the whole of his crop of table potatoes, which were purchased by the Ministry of Food at fixed prices varying according to variety, district, soil, and time of delivery. Potatoes were one of the few foods which were unrationed and in unrestricted supply. They were retailed at fixed prices showing a loss to the Ministry, and the demand was stimulated by advertising. As a result the consumption rose to nearly twice the pre-war quantity, and in 1943 was estimated at 5½lb. per person each week.

Milk Production

Milk for town supply was often referred to as "Priority Food No. 1," and every encouragement was given to increase production, especially in the winter months. This campaign has achieved a good deal of success in spite of the ploughing-up policy and the shortage of concentrates, on which in pre-war years dairy-farmers relied so largely. The industry, which is the stand-by particularly of the smallholder, has been placed on a very satisfactory price basis by the operation of the Milk Marketing Board. Herd averages are being improved by better breeding and better feeding, while new methods for control of disease are meeting with marked success. Apart from labour difficulties, and the general tendency of costs to rise in time of war, the dairying industry may look back on the war years as marking the commencement of an era of prosperity. The ploughing-up campaign will prove a blessing in disguise if it educates the dairy-farmer to the value of grass when young, vigorous, and properly managed, whether for grazing, ensilage, or hay.

Livestock

Except in the hill country, sheep flocks have been drastically reduced or even dispersed. The total sheep population has declined by more than one third, and is now at the lowest figure since accurate statistics were first collected. It may be expected that, as arable land is gradually laid down to grass again, there will be some recovery from the present low point of the sheep industry. But conditions in Britain are such as to make it unlikely that the home production of lamb could become seriously competitive with imports from New Zealand.

Some 80 per cent. of the farms are too small to run a sheep flock, even if they were equipped to do so. A great deal of the pre-war arable land is neither fenced nor watered, and to use it for sheep involves the costly system of erecting hurdles, moving them daily, and carting water to the flock. It is unusual to see a really efficient set of drafting yards, or a modern sheep dip, while not a farm in Britain boasts a shearing shed specially designed for the purpose.

Pigs and poultry, which were fed so largely on imported grain, have also declined in numbers by nearly 60 per cent. Their recovery could be very rapid if cheap grain could be procured, but the present world position does not seem encouraging in this direction.

The Future

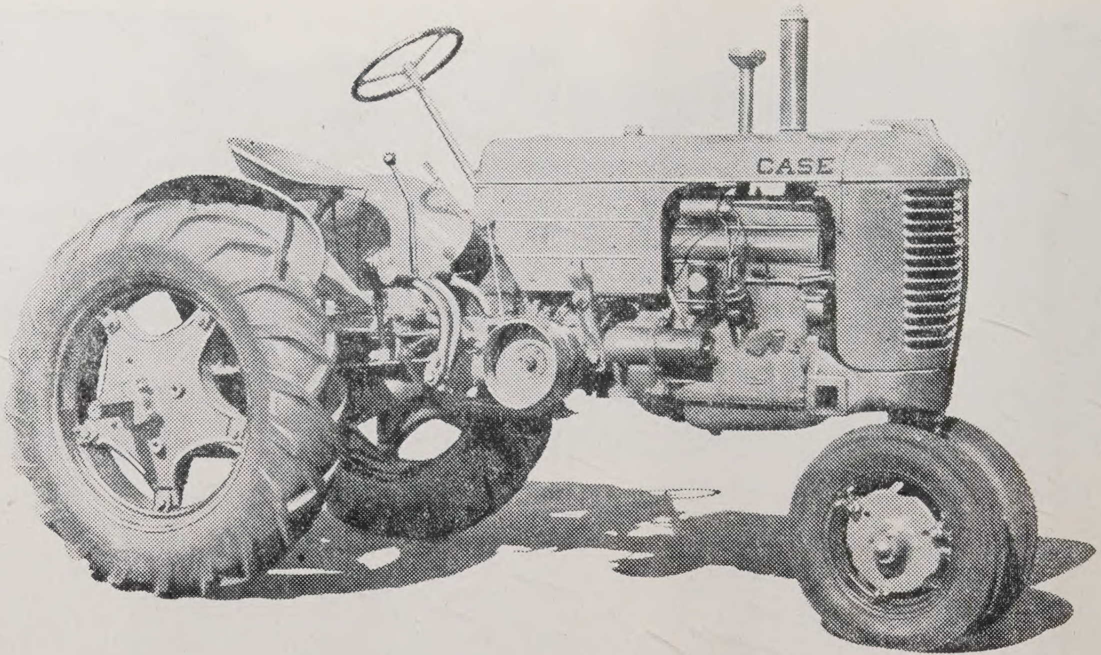
In view of the many uncertainties, it would be of no value to attempt a forecast of the future of British agriculture over a lengthy period. Last year the Government agreed to guarantee prices for meat and milk for four years ahead, so that the immediate future of these two products is assured. British farmers have had their full share of toil and anxiety during the war; they can with justification claim some reasonable safeguarding of their industry in the post-war period. In this they are supported by the full weight of public opinion.

Circle Areas

To find the diameter of a circle multiply circumference by .31831.

To find the circumference of a circle multiply diameter by 3.1416.

To find the area of a circle multiply the square of the diameter by .7854.



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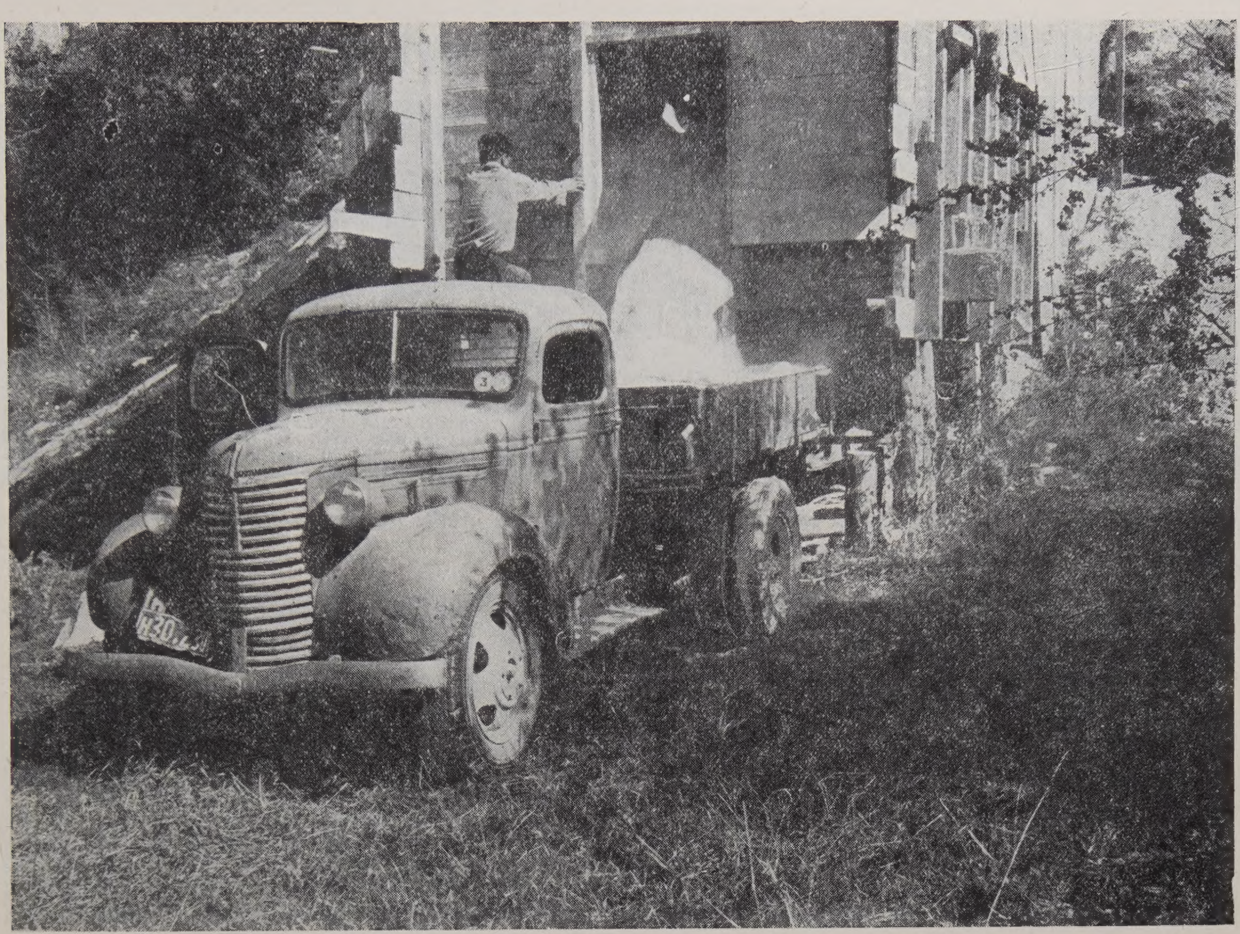


Erecting a One-man Limeworks

By P. S. SYME, Instructor in Agriculture, Warkworth.

WITH numerous and widespread deposits of limestone awaiting crushing, many farmers could overcome the present shortage by grinding their own lime on the farm. Officers of the Department of Agriculture will willingly assist by testing samples free of cost, and will advise farmers of the suitability of deposits for crushing. Small but efficient plants can be built relatively cheaply, as is shown by the experience of the Albertland farmer as described in this article.

ALTHOUGH the importance of liming in New Zealand has been emphasised from Press and platform almost from the time of the first settlement of the country, it is rather surprising that many farmers are only now beginning to appreciate just how much lime can do for their farms.

Farmers were quick to appreciate the value of artifiicial fertilisers and to realise that there was no farmer so poor and few farms so rich that topdressing could afford to be neglected. With the shortage of artificial fertilisers during the war, the logical result has been to offset this by applying more lime. The effect on many farms has proved astounding, it being found that lime alone is giving better results than had previously been obtained from phosphates alone.

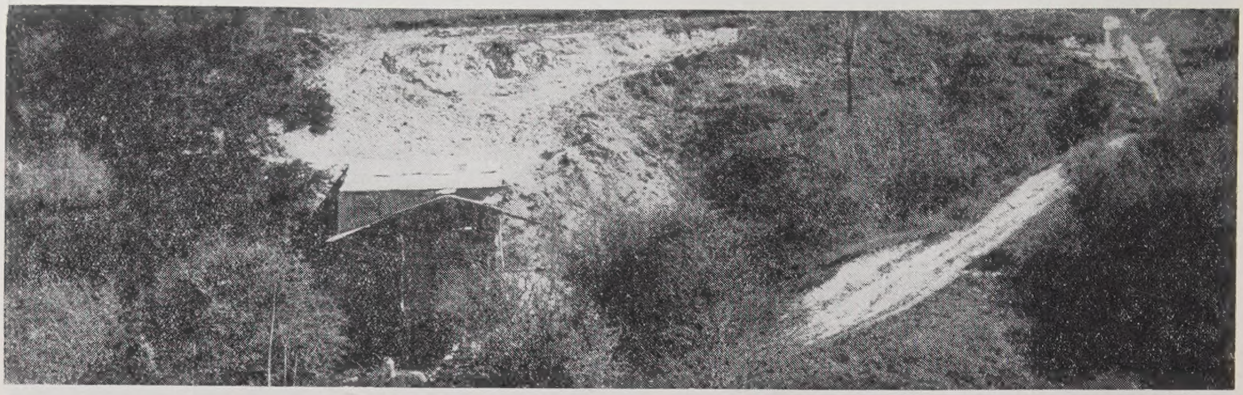
Farmers Now Lime-Conscious

Although admittedly the experience has been dearly bought, the wartime shortage of fertiliser has undoubtedly tended to make the farmer fully lime-conscious, and today the demand for ground limestone greatly exceeds the supply. Given evidence that this demand would continue, there is no doubt that private enterprise would eventually expand the output. Unfortunately, additional lime is wanted now, not in the indefinite future.

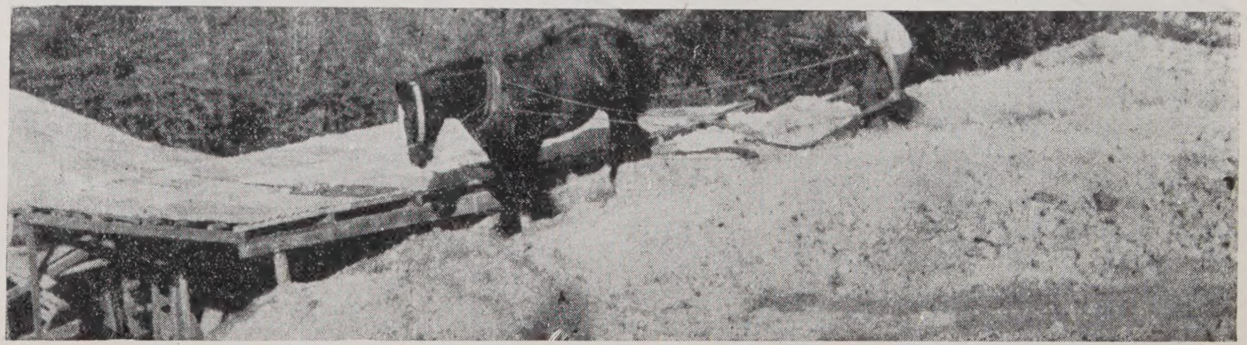
Carrying Coals to Newcastle

Many of the lime-deficient soils in New Zealand actually have immense deposits of limestone a few feet below the surface, and yet it is a common sight to see lime transported for long distances to farms where unlimited natural

OPERATING THE WORKS



General view of limeworks. The steep working face and the closeness of the limestone to the surface make for easy working with a minimum of stripping.



The limestone is easily worked down-hill by a horse scoop and tipped under the roof of the shed into the storage bin.

From the storage bin it falls mainly by gravity into the breaking-down rollers.

supplies are already available and only require crushing. Since it is not unusual for the road transport charges to amount to as much as the cost of the lime, it is obvious that considerable economies may sometimes be effected by erecting a small crushing plant on the farm and using local stone. Operated by the right man, such a plant can produce an abundance of lime for the farm and can still provide an appreciable surplus for the use of neighbouring farmers. Apart from the fact that the cost of the lime is not loaded by expensive cartage, local crushing can also effect a valuable saving in the vital oil fuel and rubber which the country so sorely needs.

Why Load Liming Charges?

Thinking along these lines, a Port Albert farmer, Mr. J. Beaver, began to ask himself why he should load his liming bill with high cartage charges. His property, like many others in the north, overlies a limestone formation with numerous outcrops very convenient for working. Tests had shown that the stone was soft and of excellent quality; it was close to the surface, and a steep working face promised very easy quarrying. With Nature providing all these essentials, surely he could attend to the crushing. Admittedly, the project would entail some spending, but at the existing prices and with a farm badly in need of lime, he would be amply and quickly repaid for his trouble. To clinch matters, he was himself a good all-round handyman and would be able to do most of the work. Viewed in this light, the amount of capital needed would be small, and would actually consist more of his own time than of his money.

Selecting Site for Works

Mr. Beaver began by prospecting for the most suitable site, having regard to convenient road access, good quality stone, and an easily-worked face which would entail a minimum amount of stripping. With several good choices available, this problem was satisfactorily solved.

Having a steep hill of limestone to work on, he decided to design the layout so that gravity should do a big share of the work, and accordingly arranged it so that the stone should continually move down-hill from the quarry to the crusher. By keeping the storage bin high enough, he could greatly facilitate loading, as the crushed lime could be run direct into a truck underneath. Attention to these points would obviously speed up the work and reduce working costs. The importance of ample storage was also fully appreciated. and he decided that the storage bin should be large enough to hold about 40 tons of the crushed lime.

Simplicity and Low Cost

From the outset he had decided to avoid heavy overhead charges wherever practicable. The outfit being primarily intended for his own requirements, high output was less important than simplicity and cheapness of operation. After all, he was in business as a farmer and not as a lime merchant. What he wanted was a one-man lime-works which he could operate, not in competition, but rather as an adjunct to the farm.

These basic points having been decided, the next thing was to procure and install the necessary equipment. Obviously, he could not construct a pulveriser, so this must be bought. However, he was confident that the remainder of the plant could be improvised by ingenuity and careful searching. A brief description of the works will show how well he has succeeded.

Installing Equipment

The pulveriser is a small four-beater model, and cost £35 second hand. As already mentioned, this had to be bought. The remainder of the equipment was mainly improvised from scrap—some of it at first sight very unlikely material indeed. An old 25-h.p. four-cylinder model Dodge engine cost £8—not a high initial cost for the power unit, and one not likely to boost up the overhead charges. The engine is cooled by a continuous flow of water from the farm supply, and is giving excellent service despite its low price.

From a pulley on the engine transmission shaft power is led direct to the pulveriser. A second pulley on the engine shaft is connected with an overhead countershaft. A suitable pulley on this shaft is connected to a pulley on the driving shaft of an old truck gear-box, which serves as a reduction gear. The transmission shaft from the gear-box drives two sets of heavy spur gears, which rotate the breaking-down rollers. These two rollers are set 1in. apart, the respective gears being so arranged that one roller revolves three times as fast as the other, causing the stone to be subjected to a rending as well as a crushing strain. Another pulley on the countershaft operates the conveyor belt, which carries the crushed lime to the storage hopper, and still another pulley is used to drive a second countershaft, which operates a conveyor belt carrying the stone from the breaking-down rollers to the hopper of the pulveriser.

Ingenious Drive Mechanism

As the engine is not fitted with a governor, it is necessary to ensure a very even load, and for this reason a rotary automatic feeder is employed to regulate the amount of stone passing from the hopper down to the pulveriser. This rotary feeder is driven in a very simple and ingenious man-

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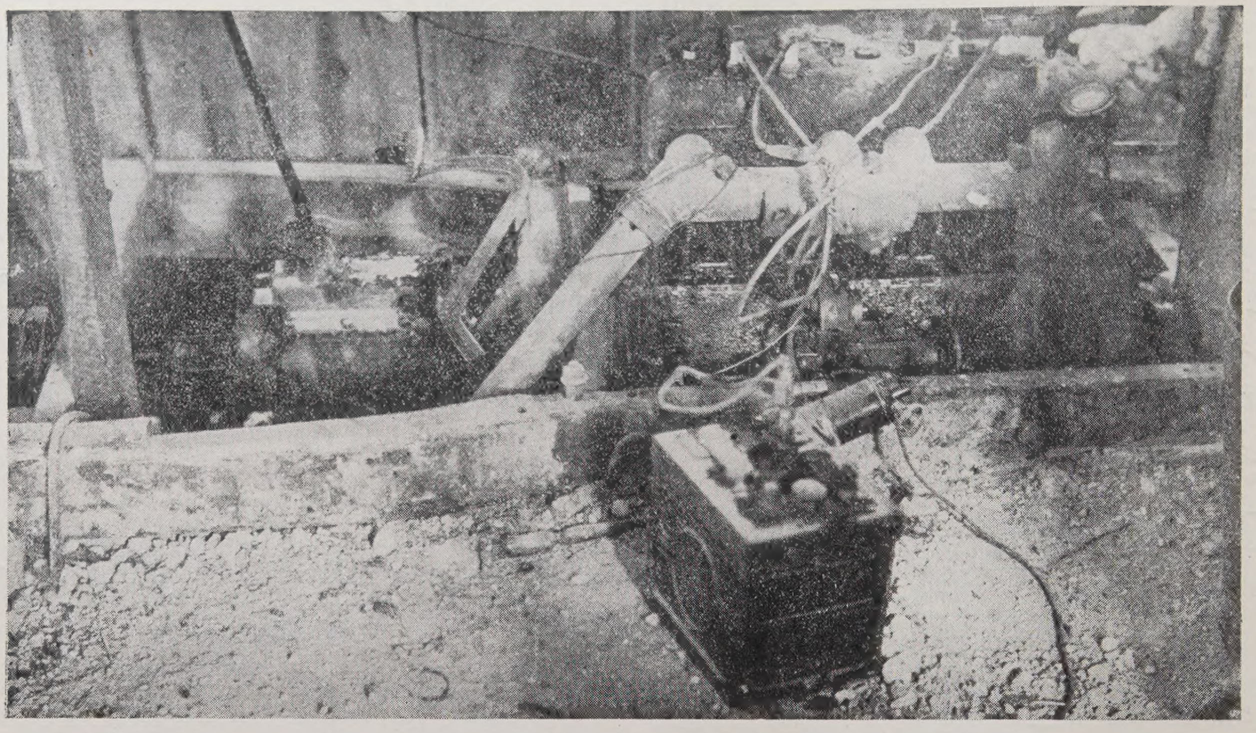
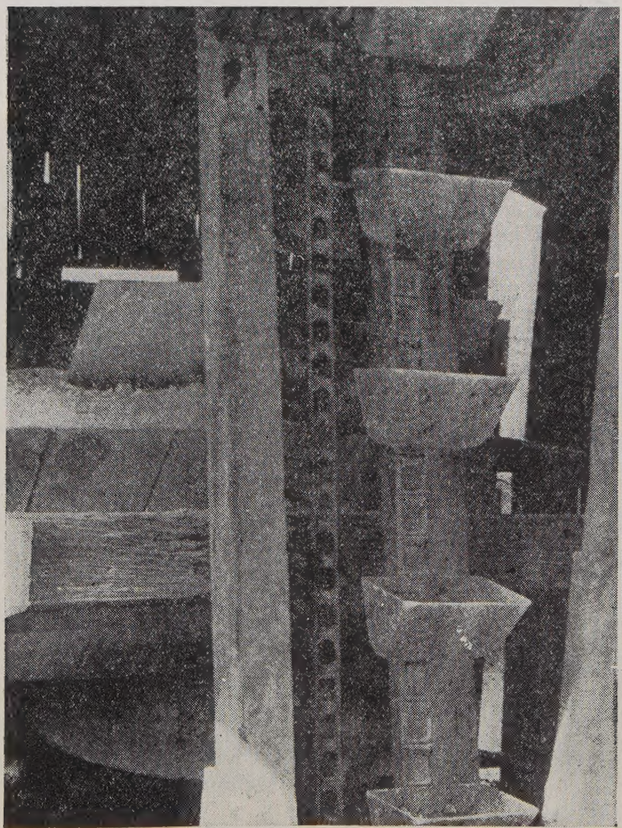
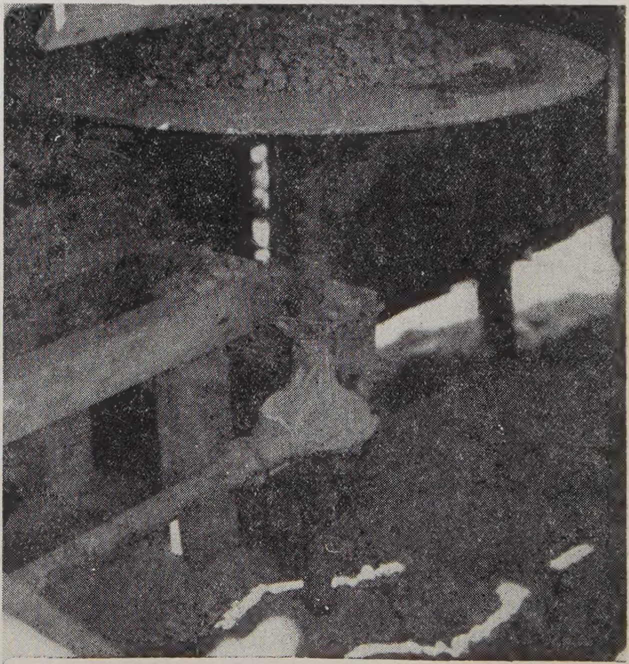


The power unit, the engine of an old Dodge car. One of the pulleys used to drive the machinery can be seen on the transmission shaft at the extreme left.





Left—The elevator which transports the limestone from the breaking-down rollers to the hopper of the pulveriser. The rotary feeder plate can be seen in the bottom of the picture.

Above—The rotary automatic feeder, showing the driving mechanism improvised from an old motor-car back axle.

ner by means of the drive-shaft and back-axle assembly from an old T model Ford car. The back axle is set on the ground vertically and the steel feeder disc is bolted to the wheel hub on the upper end of the axle. The end of the transmission shaft from the axle is fitted with a pulley, which is connected with a pulley on the overhead countershaft. This in turn revolves the feeder disc, which takes the place of the original car wheel. To render the drive effective the crown wheel was welded to the axle which carries the feeder plate.

Improvisation

Although the plant is well designed and highly efficient, considerable improvisation has cut down costs, and the motor-car junk yard has furnished much useful material. As already mentioned, the engine was acquired from an old motor-car; the drive for the automatic feeder was also an old motor-car part bought as scrap, while the buckets on the crushed lime-conveyor belt were made from an old car body, the only cost being for the rivets. An old car also provided the gear-box reduction drive for the breaking-down rollers. The two heavy breaking-down rollers, which at first promised to be difficult to find, were picked up as cast-outs from a soup-making factory for 30/-, condition as new. The various driving-belts were acquired cheaply as occasion offered, care being taken that they were in a good, serviceable condition. The leather feeder belt which carries the elevator buckets for the crushed lime was procured as a discard.

Extremely Low Cost

With much of the equipment procured at scrap prices, it is not surprising that the actual out-of-pocket cost of the entire plant was extremely low. Mr. Beaver estimates the cost somewhat as follows:—

	£	s.
Pulveriser	35	0
Engine	8	0
Feeder disc	3	0
Feeder disc drive (Ford rear axle)	2	0
Reduction gear-box for breaking-down rollers	1	0
Breaking-down rollers	1	10
Miscellaneous shafting, pulleys, gears, etc.	20	0
Total cost	£70	10

The timber was all obtained on the farm and was cut at a neighbouring mill, the only cash expense being for the sawing. The iron for the roofing presented no great problem and was mostly found lying around the farm.

The total cost of the limeworks amounted to about £200. The actual cash outlay, however, amounted to not more than about £70, the balance of £130 being mostly accounted for in the value of the timber and Mr. Beaver's own working time. That the investment has been fully warranted is shown by the efficient working of the plant. With only himself as operator and a shedful of good dry stone, Mr. Beaver can turn out about 2 tons of crushed lime per hour—and more at a pinch.

Ample Storage Important

The limestone is worked down-hill by a horse scoop into an open-sided shed, which holds a reserve store, and from this it is fed by gravity down into the breaking-down rollers. After crushing, the lime is automatically delivered into an overhead storage hopper. Experience has shown the importance of providing plenty of room for holding a reserve of dry stone, as well as having a large storage bin, as this permits of crushing being carried out at whatever time happens to be most convenient.

Lime Costs Very Low

Involving a capital charge of only about £200, and with low operating costs, the crushed lime can be produced astonishingly cheaply, the only cash outlay being for fuel and lubricant—say 2 gallons of petrol and less than a pint of lubricant per hour. As the plant can deal with about 2 tons per hour, and is operated by one man, this obviously means very cheap lime. It should be noted that this represents the cost of the lime **on the farm,** and that the quality of the crushed lime compares favourably with that obtainable elsewhere. In comparison, it may be mentioned that lime purchased in the ordinary way was costing as much as 27/- per ton on the farm—when it was available; furthermore, the deliveries were apt to be uncertain and difficult to arrange.

Mr. Beaver points out that his is in no sense a commercial limeworks, and his primary object is to supply his own requirements, though any surplus is available for his neighbours. Considering that his own farm of 160 acres requires an initial dressing of about 1 ton per acre, with, say, 3—4cwt. per acre in subsequent years to maintain the lime status of the soil, it is obvious that he can effect considerable saving on his liming bill.

Value of Small Works

Although to Mr. Beaver the work was largely an interesting hobby, it will be readily appreciated that the construction of a limeworks such as his would be beyond the scope of the average person; but for the man with a mechanical bent the home crushing of lime presents distinct possibilities.

There are numerous limestone deposits throughout New Zealand suitable for working, and in this mechanical age there is no lack of young men who are quite capable of exploiting them. Many competent farmers claim that the demand for lime in the future will tend to increase rather than to diminish, and experience shows that an efficient limeworks in a district can do an incalculable amount of good.

With an increased number of small local limeworks operating, the load on road transport would be greatly diminished, petrol and rubber would be saved for other work, and the output of farm produce would be greatly increased. What other investment can promise so much good, either to the individual or to the nation?

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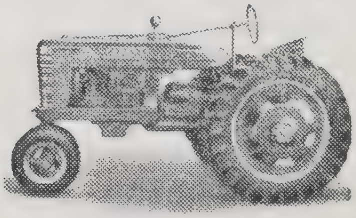
South Island: Chief Agents—Premier Products Ltd., Huddart Parker Bldgs, Wellington.

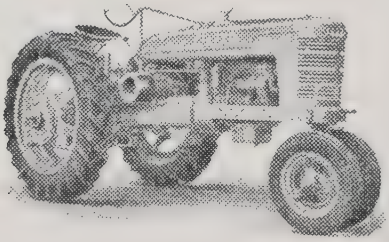
These rubber tyred Farmall and McCormick-Deering tractors arrive SHORTLY

Farmall M.



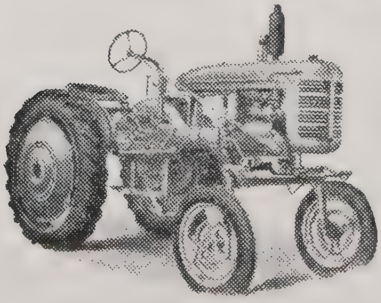
The powerful 3-4 furrow Farmall model that gives satisfactory and economical power under any field conditions.

Farmall H.



The Farmall model for the average farm. Pulls three furrows and like the M has four working speeds; and a high travelling speed of 15 m.p.h. when on rubber tyres.

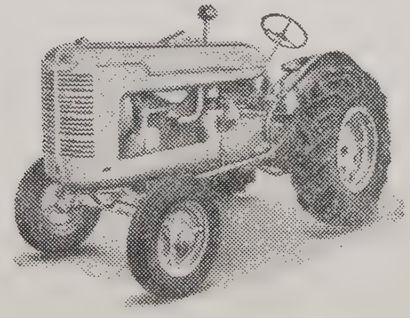
Farmall AV.
(High Clearance Model)



Designed for High Clearance.

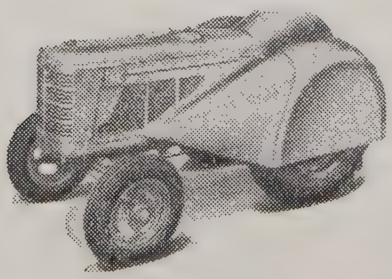
The Farmall AV gives you all the power and features of the Farmall A plus a high clearance for working in high growing crops.

McCormick-Deering
W6.



Tractors, the W6 is a three-four furrow job with a five-speed transmission, and many other features that make for easy economical operation.

McCormick-Deering
O4. (Orchard Model)



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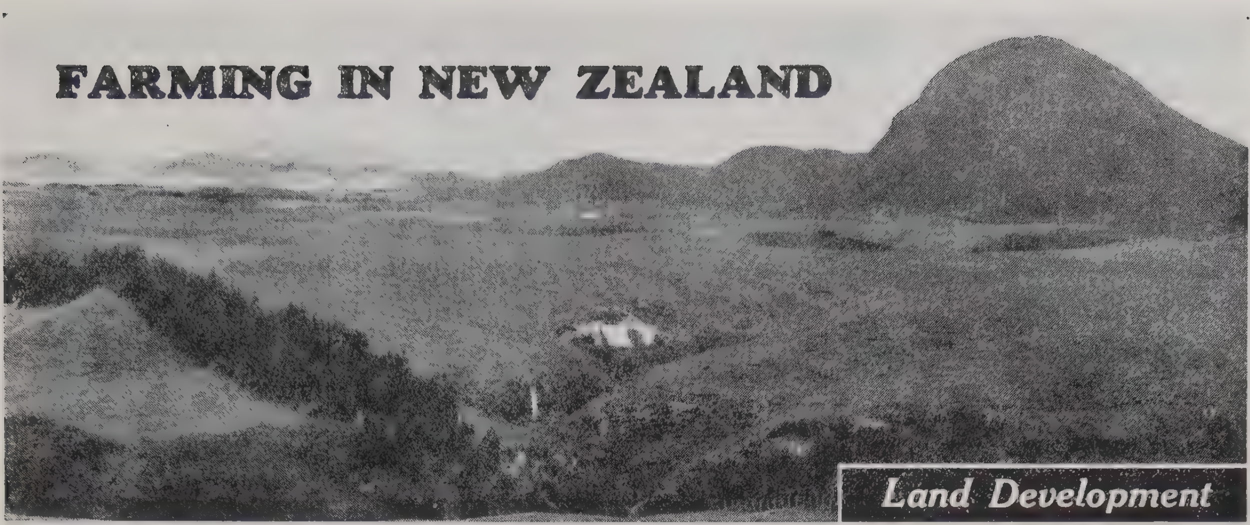
FARMING IN NEW ZEALAND



Land Development

MANY inquiries are received regarding the prospects of land development in the Dominion, and whether it is feasible for young men with little capital, but willing to work hard and live frugally, to take over unimproved land and develop farms which will ultimately provide a good living. This article traces the history of land development in New Zealand, and outlines the methods used and difficulties encountered in the development of the unimproved land still remaining in the Dominion.

By

P. W. SMALLFIELD,

Director of the Fields Division, Wellington.

NEW Zealand has now only limited areas of virgin land which are worth development. As might be expected, the early settlers generally secured the best land, and each successive generation of land developers has had to take in hand land of lower quality, or of apparently lower quality, for advances in the science and practice of farming have since enabled the economic development of land considered worthless by the very early settlers. The areas now undeveloped are generally of low natural fertility, and require both capital and experience for successful conversion from scrub to grass.

The present farmlands of the Dominion were originally covered in bush, scrub, tussock, or swamp vegetation. The tussock areas lying in the low-rainfall belt on the east of the main divide in the South Island covered flat, hilly, and mountainous areas. These tussock grasslands were first used mainly for extensive pastoral farming, and the hilly and mountainous tussock grasslands still constitute one of the Dominion's main pastoral areas. The plains lands were, however, early developed for cereal production, and later for mixed farming. In the North Island fern and tussock land of the better quality was first developed, and then, when it was found that grass and clover seed would establish in the ashes of a forest fire, the destruction of the natural forests quickly followed. In the last two decades of the nineteenth and first two decades of the twentieth century millions of acres of bush and open fern land were burnt and grassed and utilised for pastoral farming. As further land was required swamps were drained and areas of lower fertility covered in fern and scrub were ploughed, manured, and grassed. Now the remaining virgin lands consist of scrub-covered areas of low natural fertility, which require considerable capital expenditure to convert into farms.

The State has always been interested in land settlement and development. In the early days the State made land available to settlers by lease, sale, or grant. In 1892 the State commenced the purchase of large estates for re-settlement in smaller holdings, and in 1894 the State Advances to Settlers Act inaugurated various schemes for lending money to settlers for improving and developing farms. In 1929 the State commenced the actual development of Crown land for farming and the provision of fully-developed farms for selection by settlers. Prior to this the necessary preliminary work of roading and drainage had often been done by the State, but the settler was expected to develop the land with financial assistance from the State. The practice of the State developing land prior to settlement was necessitated by the lower quality of the remaining areas of unselected Crown lands. Development work is carried out by the Land Development Branch of the Lands and Survey Department, and large areas have been efficiently developed and opened for settlement in this way.

Tussock Grassland

Exploitation of natural grassland for cereal production has been the basis of large-scale settlement in most new countries, e.g., U.S.A. and Canada. Farm development did not call for much capital, the settler requiring only sufficient money for financing the cost of a team and implements, a rough house, provisions until harvest, and the necessary deposit on the land. If the first two or three harvests turned out satisfactorily, the settler was in a fair way to becoming a successful farmer.

In the early sixties much South Island tussock grassland was taken up for cereal production. Good land could be purchased at £2 to £3 per acre, and a farmer having secured a section of land would often start with very small capital. He would probably get a neighbouring farmer to skim a few acres during the summer while he worked for someone else or built his whare or rough house. In the autumn he would fence the field he intended to crop and get the person who skimmed the land to put in the crop for him, he in his turn fencing for the man who had the team. Thus the seed wheat, a spade, and a shovel were probably all he required until his first harvest. Hundreds of farmers started farming in this way in the early days of Canter-

STUMPING OLD BUSH LAND

bury. The first houses were mostly built of sods; one in twenty might be cob or wood. These sod houses were plastered inside and out with a mixture of cowdung and clay, and when dry were whitewashed all over and looked clean and tidy. Should the settler's first harvest turn out well, he might purchase a pair of bullocks and a plough the next autumn and so step by step secure all the implements required on his farm.*

In New Zealand continuous cereal production, which has proved so disastrous in many countries, rapidly gave place to mixed farming, and the introduction of pastures into the crop rotations has maintained soil fertility in the arable farming districts.

Pasture Production

Pastures required for milk production and stock fattening consist of a few species of grasses and clovers, the most important of which are perennial ryegrass, cocksfoot, and red and white clover. Other species such as browntop, danthonia, crested dogstail, subterranean clover, and *Lotus hispidus* are included to provide permanent swards under dry and low soil fertility conditions. Moist rich land requires the addition of other species such as meadow foxtail, timothy, alsyke clover, and *Lotus major*, and in the warmer districts of the North Island paspalum is included in most pastures. However, the most general pasture type consisting of perennial ryegrass, cocksfoot, and white clover demands high soil fertility, and the seed-bed must be **moist** and **firm** at the time of sowing, with a sufficiently loose surface cover to bury the small seeds. After establishment there must be an absence of severe competition from other plants. At first sight the forest, fern, and scrub areas did not look particularly inviting from the pasture establishment point of view, but burning of the bush and fern provided the seedbed necessary for suitable grass establishment, and the careful manipulation of livestock gave a fair measure of control of competing plants in the initial stages. For burning does not prevent the return of fern and scrub, and stock management in the crushing out of bracken fern is an important factor in pasture establishment.

Scrub areas vary considerably in their response to surface sowing. Where the growth is heavy a satisfactory layer of ash can be secured after burning the felled scrub, but the general low fertility of the soil usually results in pasture deterioration, unless the sward is topdressed. Consequently the forest and open fern lands were first developed, and the scrub lands of lower fertility have been seriously considered for development only during the last 20 years. The remaining areas require cultivation and manuring before grass can be established satisfactorily.

Forest

The pastures established after burning the forest land had a high initial carrying capacity, and gave the settler an immediate return for his work. As long as the settler had areas of fresh bush to chop he maintained the carrying capacity of his holding, but once his farm was fully developed carrying capacity started to decline, except on the most fertile areas. In wet areas and at high elevations on poor soils fern and scrub invaded the pasture lands; soil erosion, chiefly slip erosion, became a problem and further reduced carrying capacity.

These surface-sown grasslands still constitute one of the main pastoral areas of the Dominion, and although exact figures are not available, they probably account for 11 million acres of the 17½ million acres of sown grassland. The improvement of the surface-sown hill-country grazing lands will be very important in the postwar economy of the Dominion. Management methods to control deterioration consist of fencing and crushing second growth with stock, logging up, cutting manuka, resowing after manuka and bracken and hard fern burns, the introduction of clovers, particularly subterranean clover, and topdressing. To be effective topdressing requires the presence of clovers in the pasture, and the introduction of subterranean clover by over-sowing is usually a necessary prerequisite to topdressing.

The settler on bush country did not require a great deal of capital to start his farming operations. If he drew a section of 300 to 400 acres in a land ballot, he would probably fell 50 to 100 acres in the first year and complete the conversion of the section from bush to grass in five or six years. Starting with £400 to £500 capital (and many started with less) and the bushman's equipment of tent, saw, axe, and wedges, he would set up his camp, hire a helper, and start cutting the first section in the winter. The bush was first underscrubbed and then all tall timber under 3ft. in diameter felled. Two men would clear about 60 acres of bush in 12 weeks, and the bush was left after felling to dry until December or January for burning. Soon after burning, when the soil had cooled sufficiently, grass and clover seeds were sown in the ashes, usually with turnips and rape. Between felling and burning the settler would probably seek contract work on neighbouring farms in clearing or fencing work. After sowing the block was fenced and with a good strike of turnips and rape the area would be stocked with five or six lambs per acre. The lambs, sold fat after shearing, would probably net 12s. to 13s. for meat and wool, and this return, with the help of contract work on neighbouring farms, was sufficient to maintain the settler during the breaking-in process while he secured further working capital through the State Advances on the improvements

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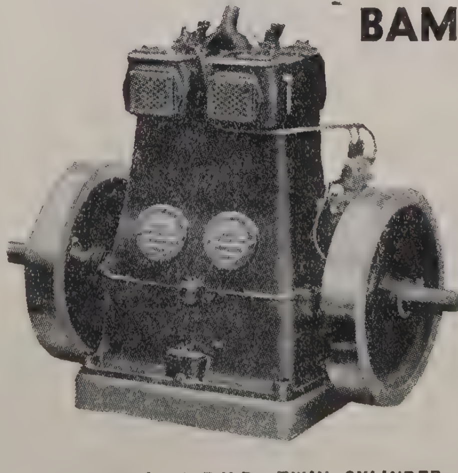

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*"Early Lincoln"—T. W. Adams. Canterbury Agricultural College Magazine, December, 1917.

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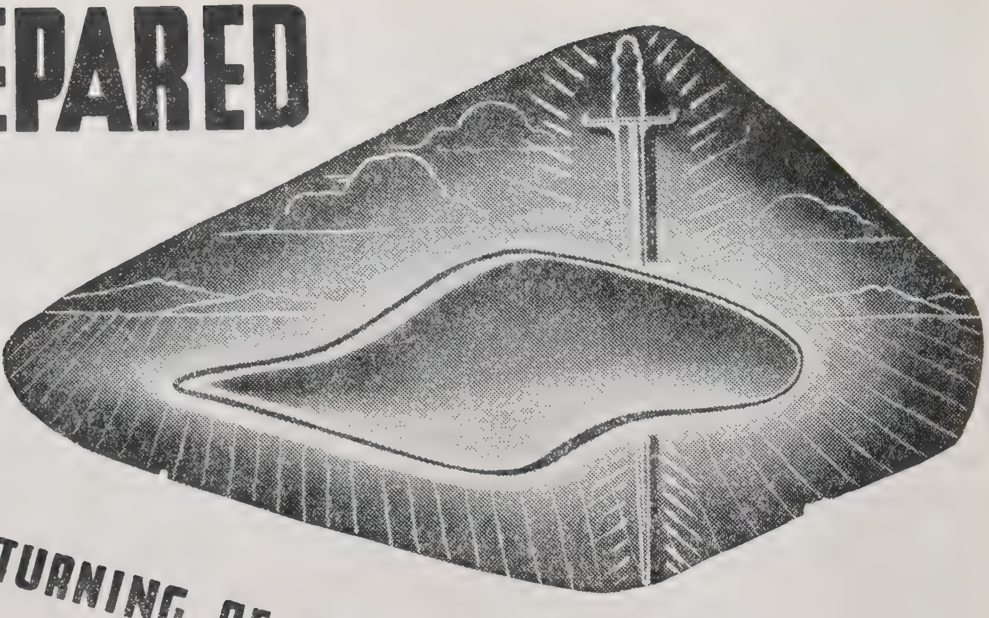

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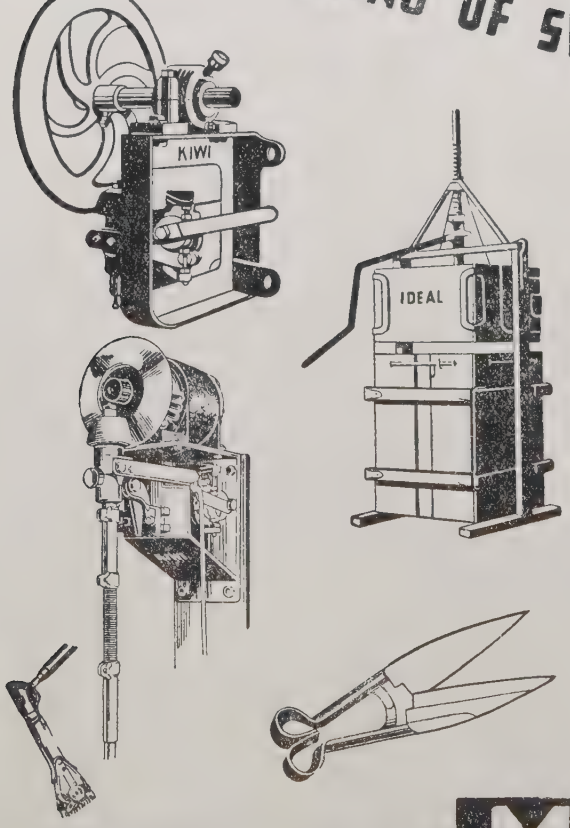

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of grassing and fencing already carried out. The next year the same process would be gone through again: a further area felled and grassed, a fresh batch of lambs fattened, and a further State Advances loan. After five or six years he would have a property of 300 to 400 acres in grass, valued at £8 per acre, with mortgages on the property for a third of the value of the improvements and an annual rent of 4s. to 5s. for the land.

On many areas settlement under these conditions was successful, while on other areas it was disastrous. Where the soil was poor and the rainfall high the tendency to revert to second growth was so strong that the pastures could not be maintained. In drier districts the original grasses and clover sown have been replaced by danthonia and fairly stable pastures maintained, and many of these swards are capable of improvement through the introduction of subterranean clover and topdressing. On the easier land as the stumps rotted the land has been cleared, ploughed, and re-sown, and good fattening and milk-producing pastures established. For all practical purposes the conversion of bush to grass has ceased and no longer offers scope for new settlers.

Fern

Open fern and tutu land originally occupied large areas in the central and eastern districts of the North Island and was early developed for pastoral farming. At first sight bracken fern would appear to be impossible to eradicate; the fronds are unpalatable, and the plants have great root development and grow with great rapidity. Yet with all its obvious advantages for holding possession of the ground, it possesses four fatal defects that make its control possible. These are the incapacity of the underground stems to develop fronds except in specially-defined places; the inability of the fronds to grow when once broken off; the extreme ease with which the frond may be broken before it expands, or when it is in what is known as the curl stage, and the long dormant season extending from the autumn to the late spring.† The usual method of converting fern land to grass on ploughable areas is first to burn and surface sow a temporary pasture of Italian ryegrass, cocksfoot, and red and white clover; red clover is the powerful plant, and with its strong summer growth is excellent for crowding out the fern and allowing heavy summer stocking with cattle for fern crushing. Cattle can be crowded on the area, so that the young fern fronds may be broken off in the curl stage and the fern crushed out. On the deterioration of the temporary pasture and the disappearance of most of the fern the land is generally ploughed, sown in swedes, and then to perennial grass following swedes. On unploughable country permanent grass, containing a good proportion of temporary elements, e.g., Italian rye and red clover, is sown after the burning of the fern, and crushing is carried out as for a temporary pasture.

There are still considerable areas of open fern and tutu land in parts of the Auckland district, but most of these are on land covered with coarse volcanic ash showers. which render the surface soil dry and difficult to grass. Other areas consist of reverted bush lands, and on country which is ploughable a fresh burn, which will clear up most of the old logs and stumps, may allow of the economic grassing of this type of reverted country, but the induced fern on this land is much more difficult to crowd out than the bracken on natural fern lands.

Scrub Lands

The scrub lands now constitute the main areas of virgin land awaiting development. They are situated on the pumice soil areas of the central plateau of the North Island and on gumland podzols of North Auckland. Of low initial fertility, they require clearing, cultivation, and manuring before satisfactory pastures can be established, and the pastures take a year or two and require regular topdressing before becoming fully productive. They therefore present a difficult proposition to men of small capital, and the usual sequence of development by individual settlers has been that the limited capital available is spent before a productive farm has been established. There have been, of course, numerous exceptions to this experience, but mainly by settlers who were in a position to keep development going by securing contract road formation or cultivation work.

To overcome the difficulties of converting scrub land to grass the State in 1929 commenced the practice of developing farms on scrub land owned by the Crown prior to settlement. The Land Laws Amendment Act, 1929, gave authority to the Minister of Lands to grass, fence, erect buildings on Crown lands, and farm the land until ready for settlement. Further authority for land development was given by the Unemployment Act, 1932, and the Small Farms Act, 1933, and subsequent amendments, and with the establishment of the Land Development Section of the Lands and Survey Department the general practice is for the State to develop scrub lands and to rejuvenate reverted land into productive farms before settlement.

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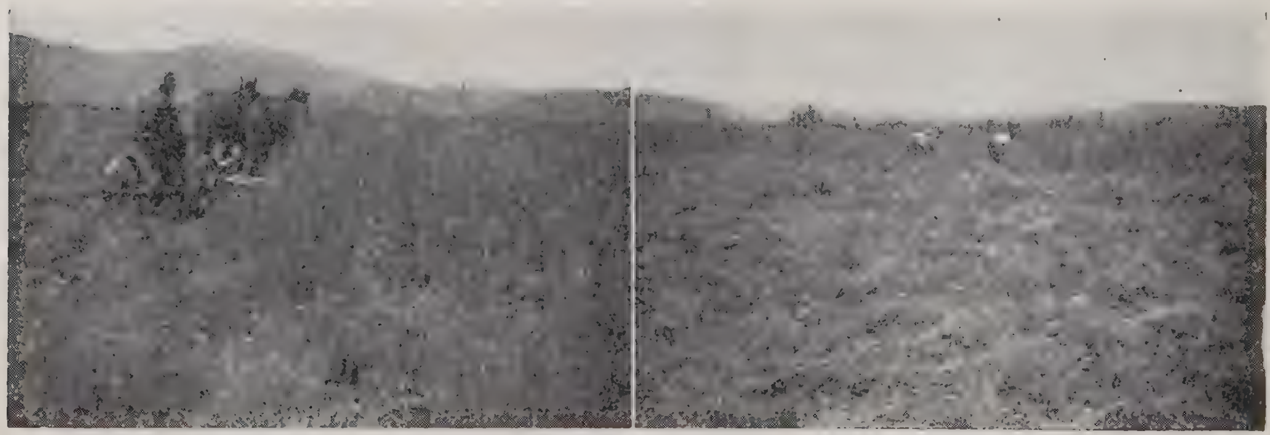
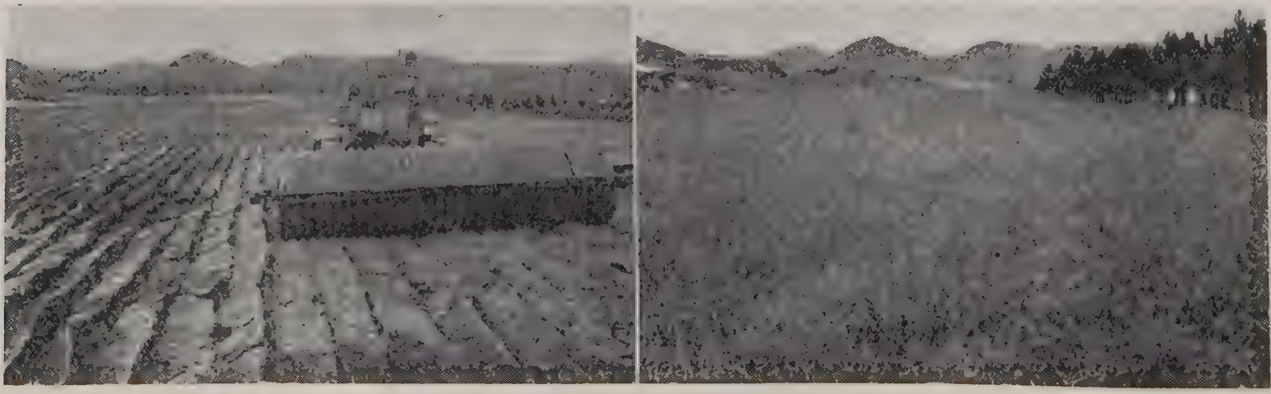
†Cockayne, A. H., "Conversion of Fern Land into Grass." "N.Z. Journal of Agriculture," June, 1916: pp. 421-439.

PUMICE LAND DEVELOPMENT

The open pumice lands of the Rotorua district offer considerable scope for settlement. The natural covering consists of manuka, manoao and tussock on the flats, and tutu and bracken fern on the hills. In development the scrub is first cut and burnt; on flat areas a scrub cutter may be used for mowing most of the manuka. If time allows, clearing costs can be considerably reduced if a fire is put through the scrub several years before ploughing.



After cutting and burning the scrub the land is ploughed, rolled on the furrow, double-disced, harrowed and rolled. Then the grass and clover seed are sown with 3cwt. superphosphate, and after a further 6cwt. of superphosphate has been applied during the following twelve months, the pasture land, provided it is annually topdressed with 2 to 3cwt. of superphosphate, has a butterfat production of 130 to 150lb. per acre.



The usual grass mixture consists of perennial ryegrass 25lb., cocksfoot 10lb., red clover 2lb., and white clover 2lb. For the first three years the dominant pasture constituent is red clover, which, if properly controlled, rapidly builds up the surface fertility and allows of the establishment of high-class ryegrass-cocksfoot-white clover pastures.

Pumice Land

The pumice lands are situated on the central plateau which forms the main watershed of the North Island. Commencing south of Lake Taupo it stretches across the North Island from the main mountain range on the east to the high elevated marine plain in the west, and extends northwards as far as the Bay of Plenty. Relatively flat over wide areas, the plateau rises here and there into high volcanic cones, flat-topped hills, and serrated ridges. Rhyolite lava flows and large masses of pumice stone form the tableland, and the numerous volcanic cones that occur throughout its extent are built up of rhyolite, andesite, and partly also of basalt. Lake Taupo is a real inland sea, covering as it does an area of 238 square miles: it is 25 miles long from south-west to north-east, and its greatest breadth is about 20 miles; it lies 1,211ft. above sea level, and is everywhere surrounded by volcanic rocks, which form a high tableland 2,000 to 2,400ft. above sea level. The Waikato River leaves Lake Taupo at the north-east end, and shapes its course north-east for a distance of about 20 miles, flowing through a broad, terraced valley on the boundary of the Kaingaroa Plain. After its junction with the Waiotapu River the Waikato makes a sharp turn to the west, flows through a mountainous region in a deep gorge, and emerges near Maungatautau in the broad plain of the Middle Waikato Basin.

The Middle Waikato Basin, comprising the Hamilton Basin and the Hauraki Lowland, was one of the earliest places where considerable areas of scrub land were converted into pasture and where the efficiency of phosphatic topdressing was first demonstrated. Settlers first developed the undulating clay and silt loam hills originally covered in fern and tutu, and later the manuka-covered flats consisting of pumice sand and silt from the Central Plateau area. The usual method of development was to cut and burn the scrub, plough and sow a temporary pasture consisting mainly of red clover, follow the temporary pasture with swedes, and then sow to permanent grass. The development of permanent pastures through the practice of topdressing commenced in the eighties, and topdressing and intensive grass farming practices have converted the land into a highly-productive dairying and stock-fattening area.

The open scrub and tussock-clad pumice lands awaiting development in the Central Plateau vary in elevation from 1,000 to 1,800ft. Settlement was originally retarded by the occurrence of bush sickness, a deficiency disease of ruminants, but this is now successfully overcome by the use of cobalt applied with phosphatic topdressing fertilisers.

The soils of the pumice area are sandy, and in an unimproved state appear particularly barren and unattractive. Probably no better description of pumice land can be given than the following extract from the evidence of Mr. J. B. Campbell before the Rotorua-Taupo Railway Parliamentary Committee, 1929:—

> The land will do nothing itself. It differs from other land in that it is only the medium by which the human factor and capital can produce revenue, whereas in the case of most other classes of land the land is the main factor and the man and capital the medium. Whatever it turns out to be is in exact proportion to what is put into it. The land itself is not an asset: it is in fact a liability. Owing to the varying nature of pumice land its development up to a revenue-producing pitch is not a clear-cut job. It is a process in which time plays the largest part: the poorer the land the longer it takes. The more it costs the less revenue it produces and the quicker it depreciates if neglected. When once started the work must be finished if a man is to get his money back or a portion of his money back. To half do a job is not better than to leave it untouched.

Pumice land development was greatly assisted from 1929 onwards by three things: the availability of perennial strains of ryegrass through the Department of Agriculture certification scheme; the cure of bush sickness, first by limonite licks and later by cobalt, and the large-scale development schemes of the State. Given good cultivation, a satisfactory seeds mixture, and adequate phosphatic topdressing, quite good permanent pastures suitable for dairying can be established on pumice land. Every operation must be thorough or failure may occur.

Developing Pumice Land

The open pumice land is covered with a tangled mass of manuka and manoao, with tussock on the colder flats. Before ploughing the surface covering should be cut and burnt. In developing pumice country a great saving can be effected in clearing costs if the manuka and manoao scrub are burnt standing two or three years ahead of cultivation. Dense manoao scrub is difficult and costly to clear in its green state, but it carries a fire well and its burnt stubs soon rot.

After clearing and burning the scrub the land should be ploughed, rolled on the furrow, double disced, harrowed, and rolled; then grass and clover seed sown with 3cwt. of superphosphate. After a further 6cwt. of superphosphate has been applied during the following 12 months the pasture land, provided it is annually topdressed, has a butterfat production of 100 to 150lb. per acre. The usual grass mixture consists of perennial ryegrass 25lb., cocksfoot 10lb., red clover 2lb., and white clover 2lb. Pastures may be either spring or autumn sown. Spring sowing takes place from the middle of October to the end of November, and autumn sowing from the beginning of February to about the end of the first week in March; later sowings may be destroyed by early frosts.

For the first three years the dominant pasture constituent is red clover, which, if properly controlled, rapidly builds up the surface fertility and

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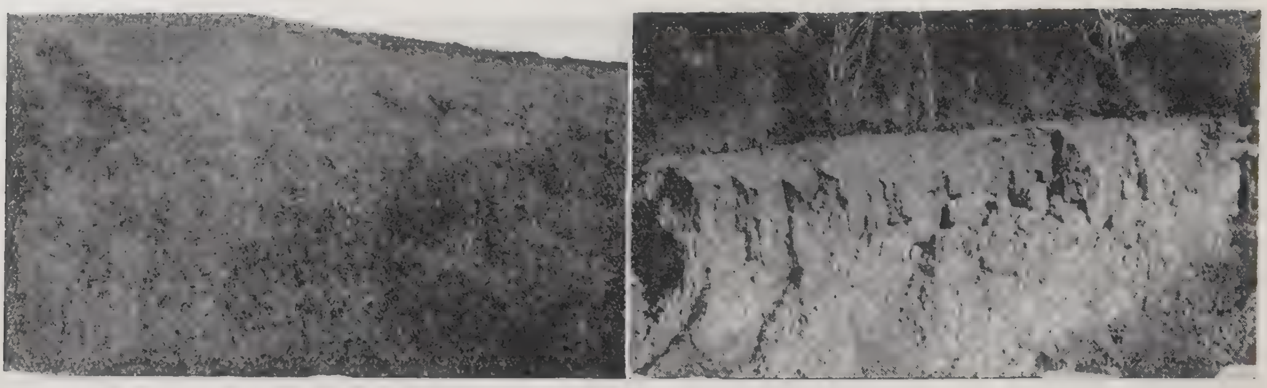
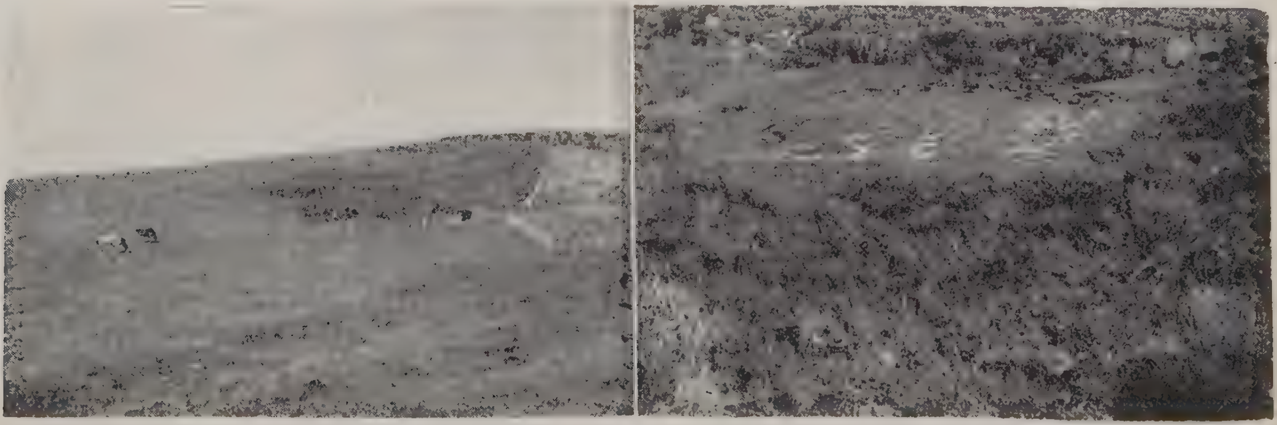
GUMLAND DEVELOPMENT



The gumland soils occur in patches right through North Auckland. The areas consist of undulating treeless downs, rising occasionally into low hills. The soils are mature podzols, acid soils of low fertility formed under conditions of intense leaching. Drainage is bad, and rushes and manuka form the natural covering.

In development the surface covering is cut and burnt and the land ploughed in autumn and early winter. The rough ploughing is harrowed in the spring and re-ploughed and kept harrowed until February or March, when it is sown in permanent grass.



The usual grass mixture for gumland consists of 25lb. of certified perennial ryegrass, from 5lb. to 8lb. of paspalum, 3lb. of crested dogstail, 2lb. of red clover, 2lb. of white clover, and 1lb. of *Lotus major*—from 38lb. to 41lb. per acre. Before sowing, gumland should receive 1 ton of ground limestone and the seed sown with 3cwt. of superphosphate or basic slag and again topdressed with from 3cwt to 4cwt. of phosphates four to five months after sowing. The lack of permanent water still limits development over large areas of gumland. Water often cannot be obtained by boring and stock have to rely on water held in dams on the hillsides. This type of water supply is not satisfactory for dairying.

allows of the establishment of high-class ryegrass-cocksfoot-white clover pastures. Grassing appears an easy matter, but there are certain pitfalls, and red clover, instead of building up the pasture, may destroy it; a luxuriant uncontrolled red clover growth will completely smother out ryegrass and white clover. For the small settler the control of a large area of red clover is not an easy matter. He is usually engaged in dairy farming, and milking cows do not thrive on rank red clover, which rapidly becomes unpalatable and has to be mown and wilted before milking cows do well on it; he has difficulty, too, in harvesting the surplus growth for the whole of the requirements of winter supplementary feeding, for he has not sufficient labour for harvesting a large area, and often makes bad ensilage and worse hay from red clover through attempting too large a harvest programme. The best routine for a settler breaking in pumice land is to sow a limited area in permanent grass, containing 2lb. red clover, and in the same year sow an area of swedes; and, after the swedes are drilled, roll, sow 5lb. red clover, 5lb. cocksfoot, and 1lb. white clover with 1cwt. superphosphate, harrow to cover, and roll again. The division of the areas will be somewhat as follows: allow 1¼ acres of permanent grass for grazing by each milking cow, ½ acre for hay and ensilage per cow, and 1 acre of swedes for every five cows. A cow to 1¼ acres will keep the pastures fairly well controlled, although the mower will have to be used occasionally for trimming. A settler can usually manage the harvesting of ½ acre per cow and the hay and ensilage saved, together with the swedes, will be sufficient for winter feeding. The temporary pasture sown with the swedes is particularly useful—the red and white clover and cocksfoot do not interfere with the growth of swedes as ryegrass does, and in the next year after the swedes are eaten off the red clover and cocksfoot plants grow luxuriantly and the produce can be made into ensilage. Delayed cutting does no harm, or the autumn growth can be kept over for winter feed to be grazed along with next season's swede crop. After being down in temporary grass for two or three years the land can be ploughed and sown in permanent grass, or ploughed and sown in swedes, and after the swedes are eaten off disced and sown in permanent grass.

Now that bush sickness can be overcome by the use of cobalt pumice land may be used either for dairying or fat lamb production, and in areas where ragwort is common sheep are best.

Gumlands

The gumland soils occur in patches right through North Auckland; the areas consist of undulating treeless downs rising occasionally into low hills. The surface soil consists of grey silts and clays, podzols—i.e., acid soils of low fertility formed under conditions of intense leaching. The grey silts, from which most of the kauri gum was dug, show the effects of mature podzolisation. Drainage is bad, and rushes and manuka form the chief part of the natural covering. The clays are drier and are covered in bracken fern and manuka. The gumland soils were long neglected for farming. Large areas were set aside as kauri gum reserves, and it was only when gum supplies became exhausted and gum prices were falling that any attention was paid to the farming possibilities of these areas. Also, as long as more fertile land was available, no one bothered about these sterile soils. Early experimenters never anticipated that these areas could be made to grow good ryegrass-paspalum-white clover pastures after being once broken up. Early development experiments aimed at first raising the soil fertility by ploughing in green crops, the use of burnt lime. sub-soiling, and tile drainage—a very expensive programme. The next stage was the use in pasture mixtures of *Lotus hispidus*, a legume which thrives on a soil below the level of fertility required by white clover. Then came certified perennial ryegrass and white clover, careful cultivation, the heavy application of phosphates and lime, and the demonstration that permanent pastures could be established as the first stage of development.

The first stage in gumland development is filling in holes and draining wet patches with manuka fascine drains. The land is then ploughed with a short-breasted single-furrow plough, allowed to weather, then harrowed and re-ploughed. The first ploughing is done in the autumn and winter and the second ploughing in the spring. After the second ploughing the land is worked over the summer and sown in February.

The usual grass mixture for gumland consists of 25lb. of certified perennial ryegrass, from 5lb. to 8lb. of paspalum, 3lb. crested dogstail, 2lb. red clover and 2lb. white clover, and 1lb. *Lotus major*—from 38lb. to 41lb. per acre. Cocksfoot and timothy are sometimes used in place of part of the ryegrass or paspalum seeding, but their use is hardly warranted. Most gumland should receive 1 ton of ground limestone before sowing, and the seed should be sown with 3cwt. of superphosphate or basic slag and again topdressed with 3cwt. to 4cwt. of phosphates four or five months after sowing.

There are still large areas of undeveloped gumland, and the two chief causes that have retarded development have been lack of water and the occurrence of kauri resin in the surface soil. The lack of water still limits settlement on these areas, and the digging of kauri gum has left the surface in a very rough condition for cultivation: the ground was roughly dug up whenever it was expected that gum existed, and the thin layer of top soil, generally only a couple of inches thick, was buried a foot or more down and deep holes were dug and left unfilled.

Swamp Lands

Swamp lands vary considerably in fertility. Low-lying areas of alluvial soil of high fertility were originally covered in white pine forest, *Phormium tenax*, or raupo, depending on the moisture conditions. These swamps when drained and surface sown carry first-class permanent pastures. Peat bogs, on the other hand, are generally of low fertility. Originally covered in rushes, the vegetation changes to manuka and bracken fern when the swamps are drained. Undrained peat is extremely wet, while overdrained peat is extremely dry; once thoroughly drained it does not readily re-wet, but forms a light porous mass that is nearly always fluffy and dry.

The essentials in grassing peat land are gradual drainage and consolidation. The initial grassing of raw peat swamps is done with Yorkshire fog and *Lotus major*, two plants that are admirably suited for pioneer grassing work on raw and unconsolidated peat. With careful drainage, consolidation, liming, and topdressing peat lands can be developed to carry fair pastures, but the usual tendency is to overdrain and dry out the peat. Areas of overdrained peat in manuka are not suitable for development by men of limited capital and experience.

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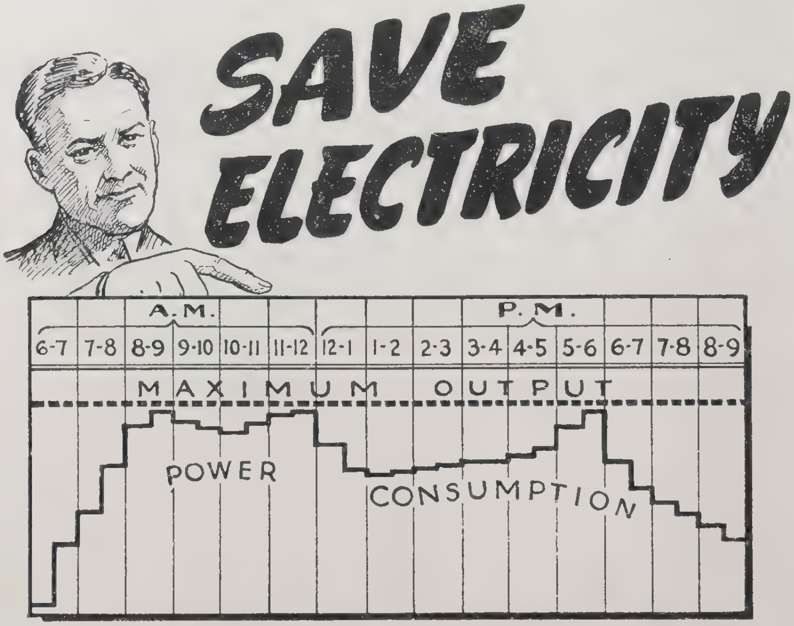

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Scrub Land Problems

The chief problem of scrub land development is that the areas are unsuitable for the production of marketable crops; the land must be sown in pasture, heavily topdressed, and utilised for dairying or fat lamb production, and the permanent pastures are not of high productivity immediately after establishment. The settler receives little or no return for his labour until the farm is fully developed.

During the war years very little scrub land has been developed, owing to shortage of manpower, fertilisers, and fencing and building materials. Prior to the war scrub land development costs varied from £18 to £28 per acre for fully-developed dairy farms capable of milking about 50 cows. Grassing cost £8 to £10 per acre, including the necessary phosphatic topdressing to make the pastures productive; water, shelter, and drainage £3 to £5 per acre; fencing £3 5s. to £5 per acre, and buildings £3 15s. to £8 per acre, depending on the type of land and standard of improvements. At the present time costs for water, fencing, and buildings will be considerably higher, and the economics of scrub land development in the post-war years will depend on the relationship of the above costs to the value of butterfat and lamb.

The foregoing descriptions of scrub land development refer generally to the areas which are the most difficult to grass. There are small areas of better-class scrub land—areas of consolidated sand in North Auckland and scrub- and fern-covered hills in the Bay of Plenty and other districts—which can be made productive fairly quickly, but such areas are very limited in extent and exist in areas where other scrub lands of low fertility adjoin them. Experience is required to pick the better land from the poorer. In general, a new settler with limited capital and experience should not attempt scrub land development, and for most the purchase of an improved farm of known production is the best investment. Apprenticeship in farm work is a necessary prerequisite to the management of a farm, and graduation to ownership of a dairy farm through sharemilking offers the best means of accumulating sufficient capital for purchase or for selection as a Crown tenant of an improved farm.

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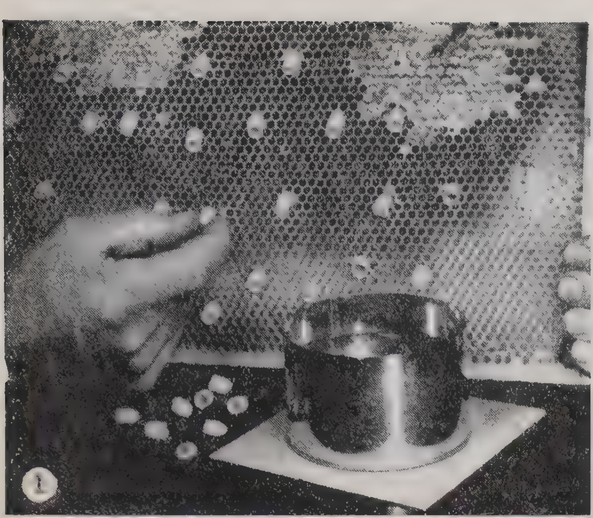
New Method of Rearing Queen Bees



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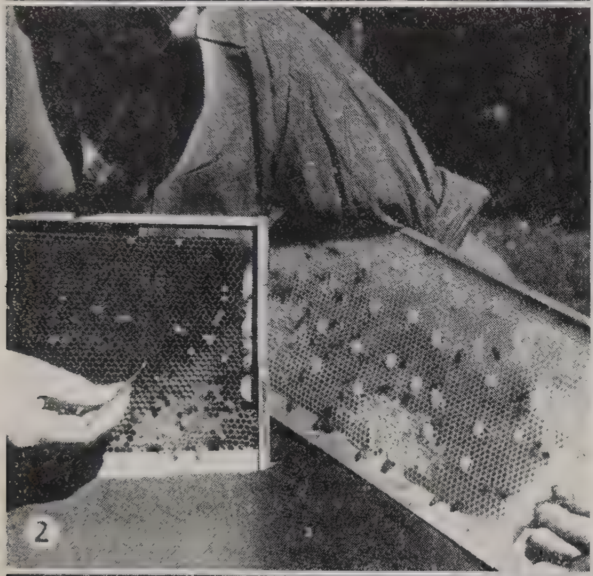

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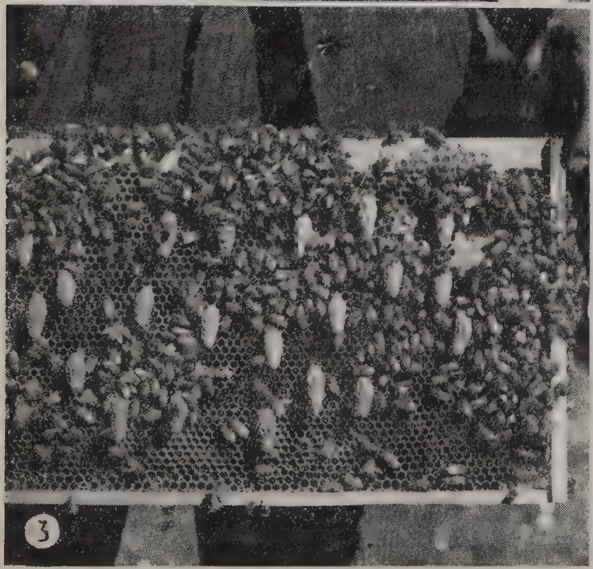

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TO effect a high average production of surplus honey it is sound practice to requeen annually with young queens, but if this is not possible it should be done every second season.

While some beekeepers prefer to induce the bees to raise queens under natural conditions, others, especially those requiring large numbers of queens, employ what may be described as artificial methods. Whichever method is used, one should always endeavour to keep as close to nature as possible. Best results in queen rearing are to be obtained during the period of a natural nectar flow.

Mr. C. A. Greig, Richmond, Nelson, has developed an entirely new method which appears to be closer to natural conditions than any other artificial methods. This method calls for the use of artificial cell cups, which are made in the usual way by dipping the rounded point of a smooth stick, just the size of the base of a natural queen cell, first into cold water and then into hot wax to a depth of approximately ⅜in. This process is repeated two or three times, taking care not to immerse the stick quite as deeply on each successive dip after the first, which will result in a very thin edge and heavy base to the wax cell cup. The wax should be kept just hot enough to keep the surface liquid.

The wax cell cups are then secured in position by dipping their bases in hot wax and placing them on the sides of a suitable comb (see Fig. 1). The most suitable comb for the purpose is one containing an abundance of fresh pollen and nectar. As some colonies are much better at cell building and caring for the young queens in their larval stage than others, it is very important to select a suitable hive, which should be one of at least two stories well filled with a strong force of young worker bees.

The queen, together with one or two combs of brood and adhering bees and also two additional combs, one containing honey and one empty, may be placed in a nucleus hive for safe keeping until the queen cells have been raised, after which the nucleus including the queen is reintroduced to the original hive. All other unsealed brood in the hive should be removed and placed on another hive in the apiary, thereby releasing a greater number of nurse bees to attend to the batch of young larvae to be given to them.

A space is left in the centre of the upper super in the prepared hive ready to receive a comb of grafted cell cups. On each side of this space are placed combs containing fresh pollen and nectar. The hive is then left for an hour or so, during which time the absence of the queen becomes fully apparent to the bees, thus creating in them a keen desire to raise queen cells.

Newly-hatched larvae 12 to 24 hours old from a selected breeding queen are transferred by the usual method, one into each of the artificial cell cups fixed direct on to the comb as illustrated (Fig. 2). A crochet needle with the hook removed and the tip slightly flattened makes an ideal transferring needle. This operation is best performed in a warm room to avoid chilling the larvae. On the other hand, care should be taken to avoid the direct rays of the sun. In approximately 10 days the cells are ready for introducing to nuclei hives.

Fig. 3 shows a fine batch of cells raised by this plan. Up to 85 good cells have been raised at a time on two combs in a single hive by this method.

—*A. J. MYERS, Apiary Instructor, Greymouth.*

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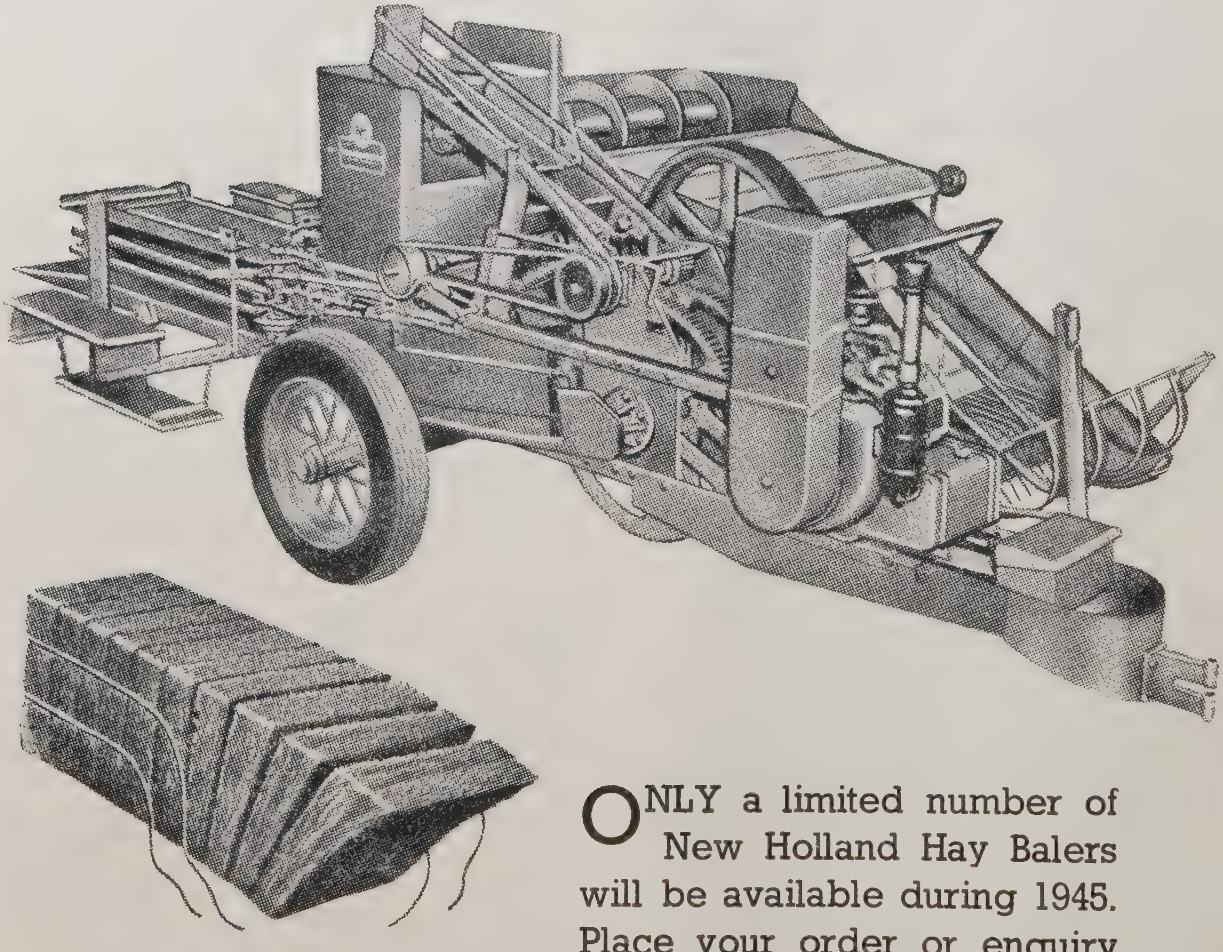

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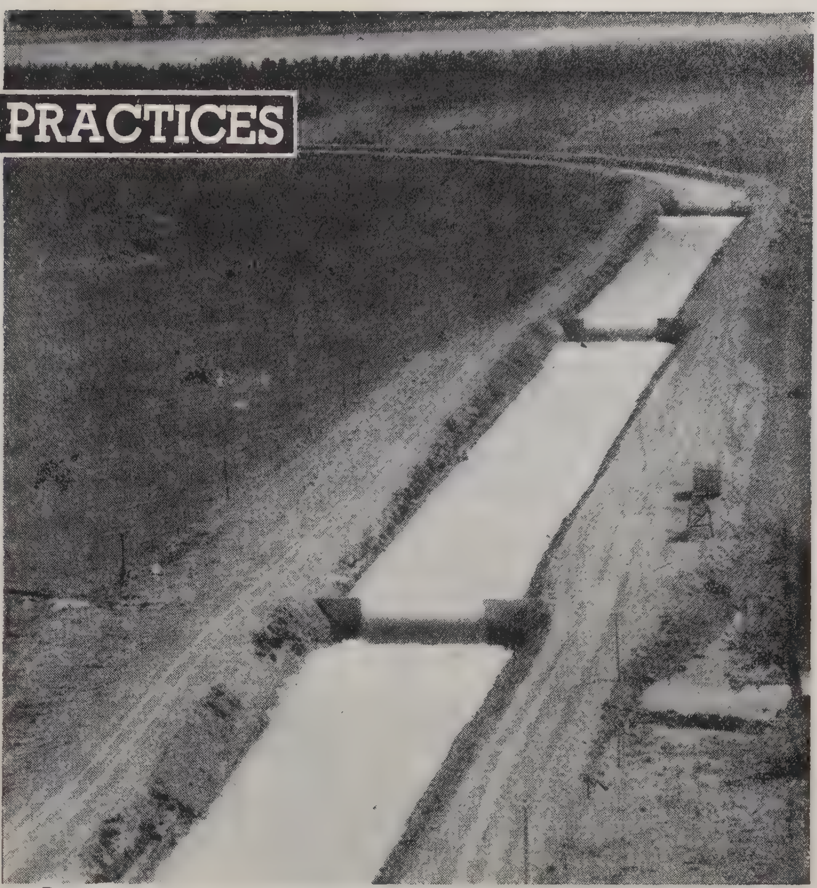
IRRIGATION PRACTICES



THE irrigation of land is as old as history, and was practised by the ancient civilisations of the world in Asia Minor and China. There were well-defined irrigation systems in South America in the lands of the Aztecs and Incas when their country was invaded by the Spaniards, and apparently they had been in operation for many years before that.

By

G. G. CALDER,

Instructor in Agriculture,
Ashburton.

TODAY there are few countries of the world where irrigation is not practised in some form or other. The most extensive irrigation areas are in tropical and sub-tropical districts, usually situated inland from the coast, where there are definite periods of low rainfall, as in most of the rice-producing areas of the world, where large amounts of water are required to bring the crop to maturity. Also, hot desert areas where water has been made available have become veritable gardens, such as in Mexico, Southern California, and parts of Australia, where orchards, pastures, and truck crops are irrigated.

Although the main purpose of irrigation is to supply moisture to the land, this is not always so, and in a number of cases the value of irrigation is not due to the water but to the silt or plant foods carried in the irrigation water and deposited on the land. This is the case with irrigated areas in Scotland, England, and Europe. Indeed, on one of the Italian irrigation schemes the land has been built up many feet by the deposits of silt left after irrigation. In the case of the Egyptian Nile and the Chinese Yellow River, the combination of both moisture and silt derived from the irrigation water of these rivers has maintained the fertility of these irrigated lands for centuries without the use of chemical fertilisers.

Start in Central Otago

Irrigation in New Zealand commenced in Central Otago in the gold-mining days. With a rainfall varying from 9.5 to 15in. a year and hot summer temperatures, the miner found it necessary to use some of his mining water to produce a garden. He then extended it to provide grazing and hay paddocks to keep a cow, until today there are 70,000 acres of established irrigated land—mainly pasture land with lucerne and red clover for haying, and a small area in drill crops of potatoes, mangolds, or carrots. In sheltered areas there are high-producing irrigated orchards.

During the years of development of irrigation in Central Otago the irrigator, to make a living on the relatively small holdings of the irrigation farmer, has had to learn by experience the best methods of management of pastures and crops under irrigation, and then the best methods of utilisation of the crops produced. Before irrigation the land was arid and sparsely covered with native grasses, with a carrying capacity of one sheep to many acres. Today this land is carrying the best pastures in Otago, if not in New Zealand, and in some cases grazes up to 8 ewes and their lambs per acre, or a milking cow and a dry beast to 2 acres, as well as providing sufficient hay for winter feeding for 5 months of the year.

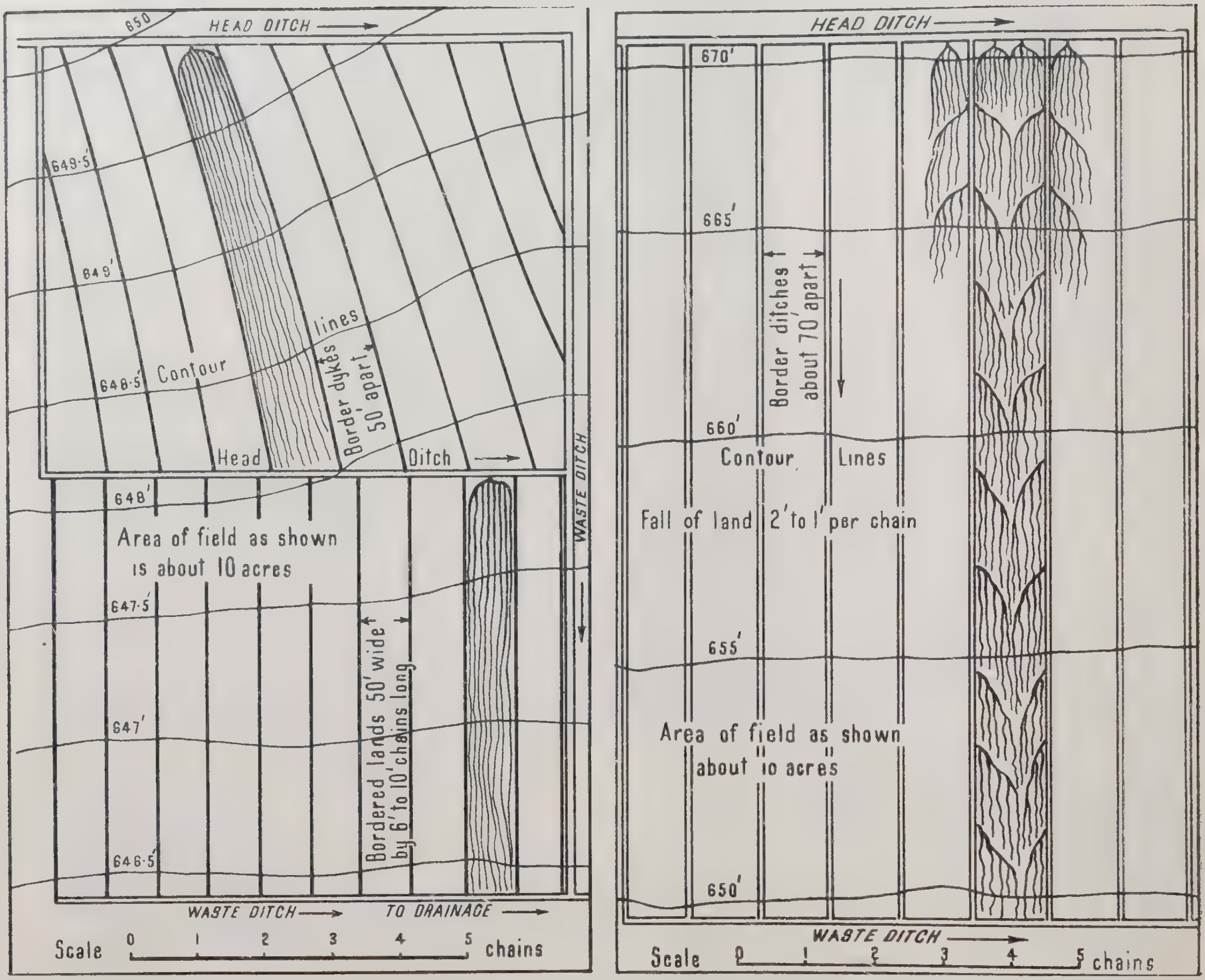
Farmers' Scope Limited

The present position of Mid-Canterbury farmers, especially on the lighter land, is that a certain type of farming is "forced" on them by weather conditions and periodic droughts requiring them to cash in on their fertility. This is a costly system, involving renewing of expensive pasture and heavy wear and tear on implements. Under irrigation, with security against droughts, these farmers could determine their own system of farming.

Irrigation opens up new and profitable avenues for farming, not only from the individual but also from a national point of view, in that farms which today, without irrigation, are little more than or barely economical holdings, will, under irrigation, be capable of subdivision into two or three farms, each capable of returning a reasonable and decent standard of living to the occupier.

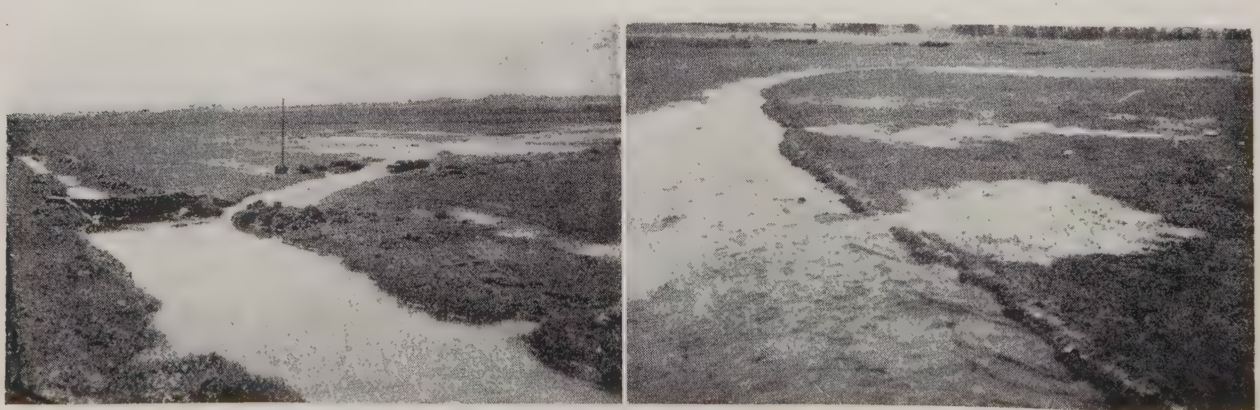
Under normal climatic conditions in Mid-Canterbury the drying out of the

SYSTEMS OF IRRIGATION


HEAD DITCH
650
649·5'
649'
648·5'
Contour
lines
Border dykes 50' apart
Head
Ditch
648'
Area of field as shown is about 10 acres
647·5'
647'
646·5'
Bordered lands 50' wide by 6' to 10' chains long
WASTE DITCH
WASTE DITCH
TO DRAINAGE
Scale 0 1 2 3 4 5 chains
HEAD DITCH
670'
665'
Border ditches about 70' apart
660'
Contour Lines
Fall of land 2' to 1' per chain
655'
Area of field as shown about 10 acres
650'
WASTE DITCH
Scale 0 1 2 3 4 5 chains

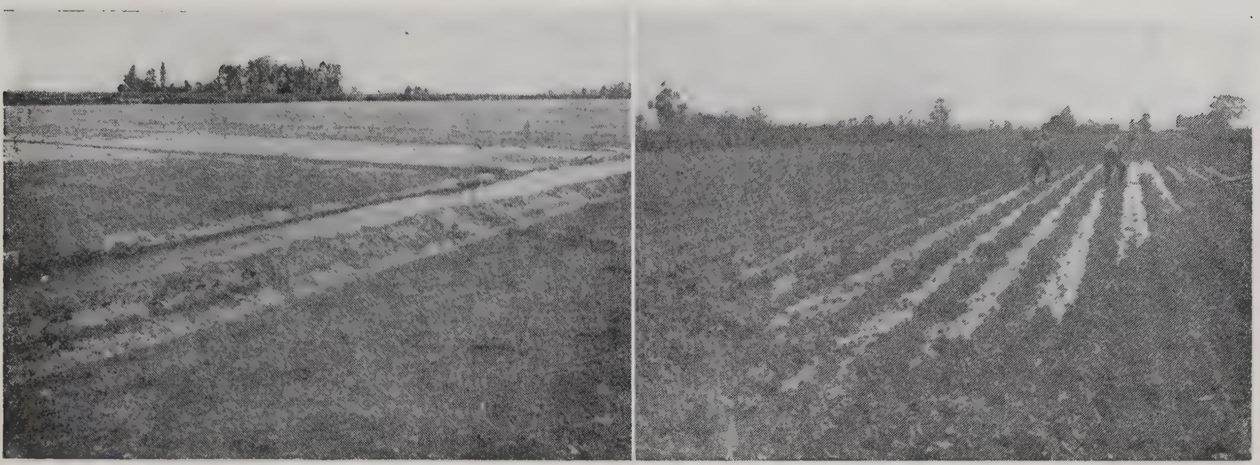
Left—Border dike method. Right—Border ditch method.

[The above diagrams are reproduced from "Irrigation," by R. B. Tennent and J. R. Marks.



Left—Irrigation by wild flooding. Right—Irrigation from contour race.

SYSTEMS OF IRRIGATION



Left—Border dike system. Right—Furrow method.

land and the burning up of the grass by the nor'-west winds during December, January, and February, limit the activities of the farmer on the light plains land to sheep-farming and grain growing. The stock-carrying capacity of the farm is restricted to the carrying capacity of the dried-up pastures during these three months.

Bottleneck Eliminated

This bottleneck to stock-carrying capacity during December, January, and February will be eliminated under irrigation by the production of vigorous-growing pasture. The growing of large areas of rape, which itself can be a doubtful crop, may also be avoided, as the lambs will probably fatten on the irrigated grass paddocks. By the saving of hay and ensilage supplementary crops of turnips and greenfeed can be considerably reduced or cut out.

The growing of grain on the light land is not done so much from choice as from necessity. With worn-out pastures requiring renewal every few years a grain crop is taken to pay the costs of cultivation and regrassing of the area, and, incidentally, to cash in on what fertility the pasture has built up. Under grassland irrigation, with the consequent heavy stocking required to utilise the feed produced, the fertility of the land will be built up to the extent that a good grain crop can be taken without having an exhaustive effect on the land.

Without irrigation, paddocks ploughed up for wheat are those carrying inferior turf and on which the pasture has practically run out—in other words, land in which there is a poor supply of humus. On an irrigated farm wheat will be grown on lea paddocks on which a solid turf has been established. The incorporation of this turf in the soil by ploughing and subsequent workings will produce an excellent tilth with a good humus content, humus being a valuable soil constituent for crops, especially under the dry conditions of Mid-Canterbury.

Irrigation will increase grassland farming by producing truly permanent pastures; it will increase the sheep and lamb population, reduce or eliminate costs of producing rape, turnip, and greenfeed crops, and will not only halt the depletion of fertility of light land by wheat-growing, but will actually build it up to produce heavier wheat yields.

Methods of Irrigation

There are a number of methods of irrigating land, of which the following are the principal:—

1. **Border Dike.**
2. **Border Ditch.**
3. **Contour.**
4. **Wild Flooding.**
5. **Furrow.**
6. **Basin-check.**
7. **Overhead.**
8. **Sub-irrigation.**

Modifications and combinations of the above methods are also used.

1. The Border Dike method is the most efficient in utilisation of water and saving of labour. It is used where the land is comparatively flat and the fall does not exceed about 1ft. per chain. "Dikes" or "ridges" are built up on the field more or less along the fall of the land and the land levelled between them. The dikes are approximately half a chain apart and from 5 to 10 chains in length, and are used to confine the flow of water between each pair of dikes or levees (a term used freely in America). The actual length and width of the borders depend on the volume of water available for irrigation. In Central Otago the borders are half a chain or less in width and usually about 5 chains in length. The volume of water used is 4 cusecs or less. In the Ashburton district, with 8 cusecs available, borders are 40ft. in width and 10 chains in length. The outlet gates are constructed at the top of each

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border on the bank of the farmer's head-race. By damming this head-race, usually with a canvas sheet, the water-level is raised and water flows out of the outlet gates on to the borders. If desired, a number of borders can be irrigated simultaneously. This, of course, means dividing up the available water. Some Central Otago orchards are irrigated by this method, the trees growing on the line of the border.

Preparing land for the border dike system requires experience. Central Otago farmers have improvised their own machinery and have become expert in its use. The land is ploughed and worked, and then the high spots are levelled and the hollows are filled in with the scoop. The dikes or levees are set up by using a levelling implement which is driven across the line of the borders, levelling the land as it goes. When it comes into line with a dike it dumps the load of soil it has gathered and travels on to the line of the next dike, where another load of soil is dumped, and so on, backwards and forwards across the area, until all the dikes are built up. A ridger is then run along each dike to straighten it up.

The leveller is made in the form of the capital letter "H," suitably stayed. The cross-piece is of iron plate and projects about ¼in. below the level of the parallel runners. The iron cross-piece forces soil ahead of it, dropping it in hollows, and when on the line of a dike the iron piece is raised by means of the long lever and the soil is dropped. The cross-piece is then dropped, and raised again on reaching the next dike.

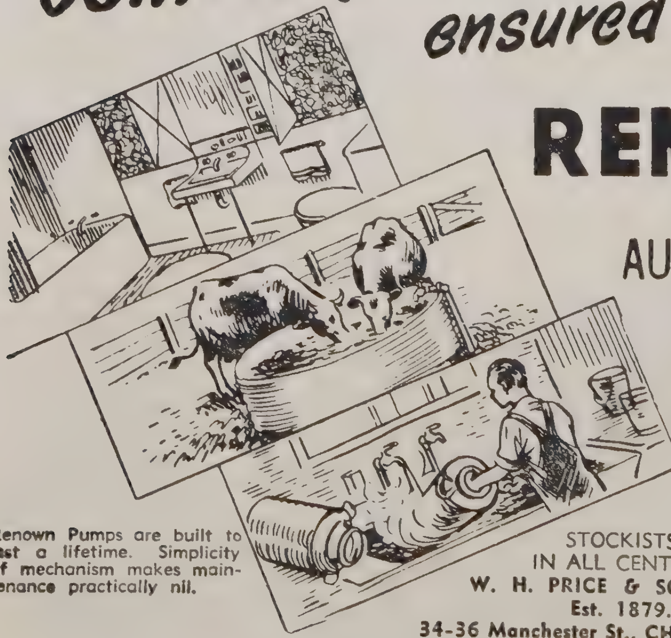
In Mid-Canterbury the Works Department is making a good job of bordering for farmers at about £3 to £4 per acre, using powerful road graders. One machine makes the borders while the other levels the land between the borders. The machines also make the head-races, this work being included in the above charge.

2. **The Border Ditch method** is used where the fall of the land is over 1ft. per chain, and can be constructed direct on to pasture land without previously working and levelling it. Instead of dikes being constructed as in the border dike method, races or ditches are made down the fall of the land from the head-race. From these races the water is distributed on to the land.

3. **The Contour method** is carried out on land with fair to considerable fall, and is probably the most common system in use in Central Otago on pastures, lucerne, etc. The irrigation race follows the contour of the land. It is given a fall of 3 to 4in. per chain, and when dammed with a canvas sheet is allowed to spill over in small volumes from a number of points and trickle down some chains to the next contour race.

4. **Wild Flooding** is not as haphazard as its name suggests. The water is discharged from the head-race at a high spot, and the irrigator directs it with a shovel to different parts of the area through small channels and stop-banks until the whole area is covered. With subsequent irrigations the water travels along the line into which it was previously directed, although it is usually necessary for the irrigator to keep his eye on it and do a little more re-directing.

All the above methods are used for pastures and permanent hay crops. Annual crops such as wheat, oats, barley, and peas do not generally lend themselves to irrigation under New Zealand conditions. This is due principally to the fact that with spring-sown crops the land is not sufficiently consolidated to carry irrigation water on the surface. It seeps through the field to the depth of the plough fur-



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row, resulting in a heavy application of water and a consequent bogging of the land. With autumn-sown crops the land consolidates sufficiently during the winter and early spring, but with the earlier harvesting of autumn-sown crops irrigation water as a rule is not required. If it is given, it frequently induces second growth in barley, oats, and peas. Field crops have been, and are, successfully irrigated in Central Otago from contour races where land has a fairly good fall, but this is the exception more than the rule.

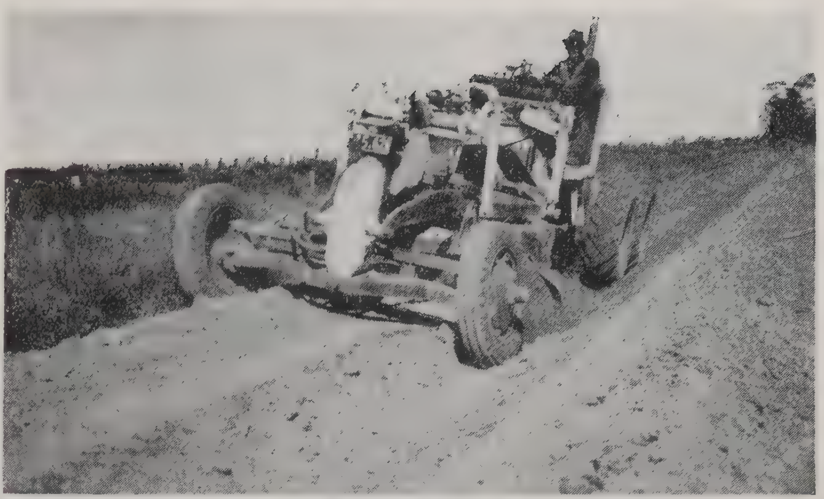
5. Furrow method. Annual crops are, however, grown well under the furrow system of irrigation. They are grown in drills and the water is run down between them. Potatoes, mangolds, swedes, carrots, and maize for greenfeed are regularly grown in this way in Central Otago, and this method will undoubtedly have a place in Mid-Canterbury.

In the preceding irrigation methods irrigation water flows over the land and soaks down through it. In furrow irrigation the water flows along between the drills and travels sideways and upwards as well as downwards in the soil. In the actual furrow one quickly gets the fourth stage of wetness described later to at least the depth of the ploughed soil. Then, by capillary action, the water moves sideways into the drill. Small volumes of water are used on a number of drills simultaneously. In a dry spring the land frequently dries out during the working and erection of the drills. The seed is sown and the area is irrigated to provide moisture to germinate it. As soon as possible after irrigation, when the furrows will carry a horse, they are scuffled with a horse hoe to mulch the surface, thus checking evaporation.

Furrow irrigation can be used on land with a gentle fall of a few inches per chain when the furrows are made directly up and down the fall of the land, or can be used on relatively steep land with a fall of some feet per chain by continuing the drills or furrows, not up and down the fall of the land, but at a gentle slope across the fall of the land.

6. Basin-check method. This method is apparently used more extensively overseas in orchards and in rice production. The writer has seen this method used on only one orchard in Central Otago, where it was quite satisfactory. A check is formed round a tree or a number of trees and the basin thus formed is filled with water.

7. Overhead. This is a system of overhead sprays, and an excellent one for irrigation. The writer is aware of only three systems of this type in operation in Central Otago. The limiting factors to its use are the cost of piping the area to be irrigated and



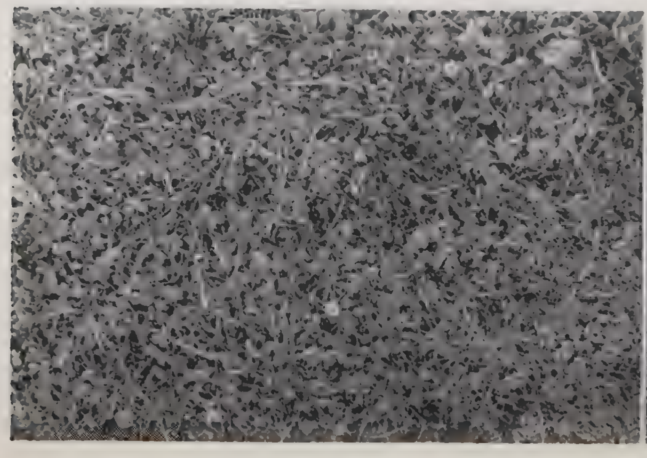
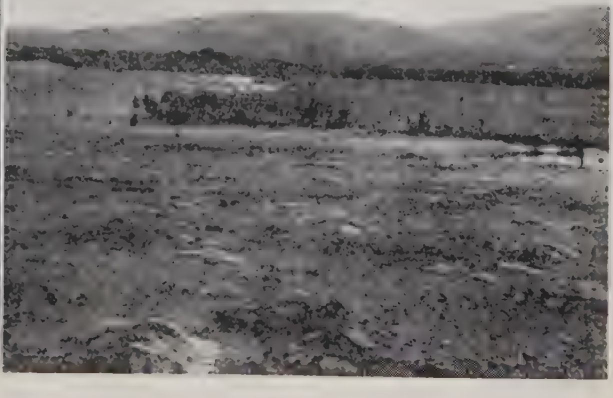
Preparing head-race.

Construction of border for border dike system.

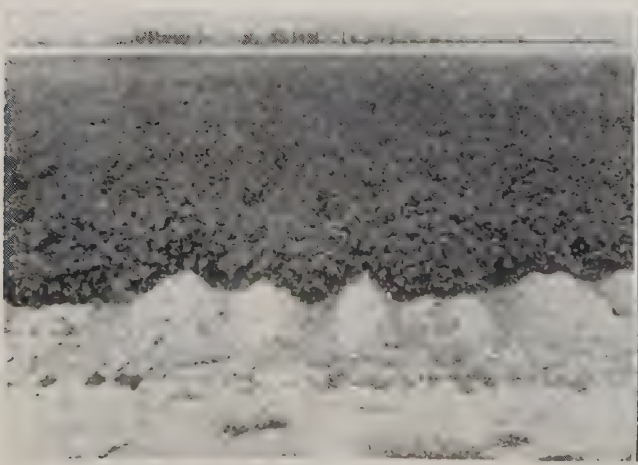
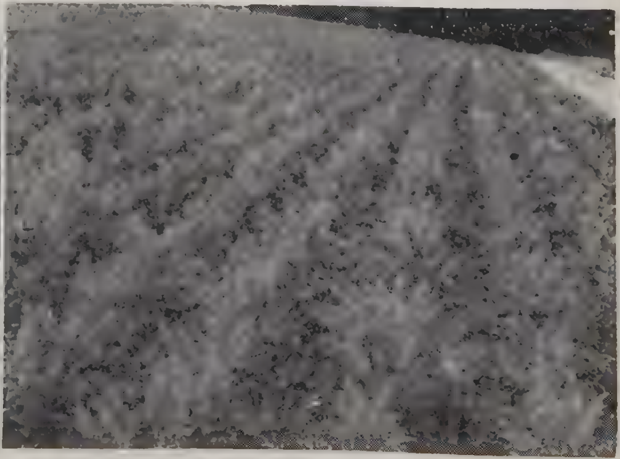
Area prepared for border dike system and ready for sowing clover.

FEATURES OF IRRIGATION

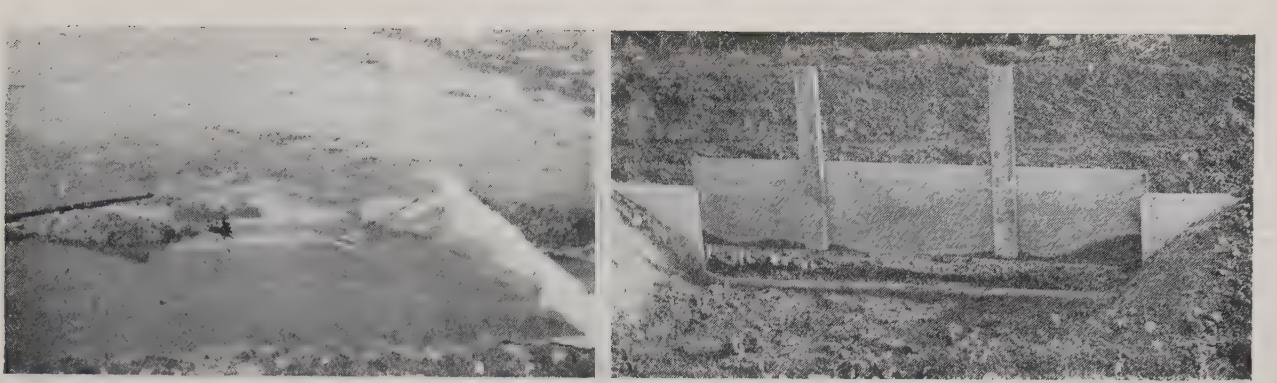
Left—Contour race coming from main race. Right—A home-constructed flume carrying irrigation water across a gully.

Left—Typical irrigated pasture. Right—Pasture above and below contour race running through centre.

Left—Potatoes growing under furrow irrigation. Right—Carrots growing under furrow irrigation on slope with furrows running across land.



Left—Canvas dam in head-race spilling water on to border. Right—Concrete head-gate for border dike system.

the need of a good pressure to force the water through the pipes and spray nozzles. This method is apparently extensively used overseas on orchards and for truck crops.

8. Sub-irrigation. By this method the water-table is raised to a little below the roots of the plants, or water is forced from a series of openings in a system of pipes placed underground; the water then rises to the surface by capillary attraction.

IRRIGATION AND SOIL MOISTURE.

The amounts of irrigation water to use and the frequency of application vary with each soil type and also with the subsoil underlying it. Some of the first questions an irrigator asks himself are. "How often will I irrigate, what volume of water will I use, and how long will I let it run?" These questions are naturally bound up with the type of soil and the fall of the land.

The type of land to be irrigated is a major factor in the amount of water the land will absorb and hold. Drainage goes hand in hand with irrigation. Without drainage irrigation would be rather a difficult business. An open, gravelly subsoil is probably the ideal type to allow the escape of surplus water, although over-irrigation must be guarded against, or many of the valuable soil constituents may be leached out and lost in the drainage. A subsoil of a hard-pan nature is the most difficult type of land to irrigate, as great care is required to apply only the correct amount of water that the soil will hold; otherwise water-logging of the land will occur. Between these two types there is a wide range of subsoils, and once a farmer has had practical experience of any one type he then has an idea of what to expect when he encounters another type. A coarse sandy soil has a poor water-holding capacity and requires frequent irrigations of small amounts of water, say 2 to 3in. of water every 10 days or fortnight, as compared with a good clay or silt loam soil that will take 4 to 6in. every 3 to 4 weeks. The incorporation of humus in sandy soils will build up the water-holding capacity of this type of soil considerably. This is seen in most of the Central Otago irrigated pasture areas, which are mainly of a sandy nature. When first sown down they require frequent irrigations, but now, with the heavy stocking, a good humus content and a thick turf have been built up. The humus and turf act partly as a sponge to hold the moisture and partly as a mulch to check evaporation.

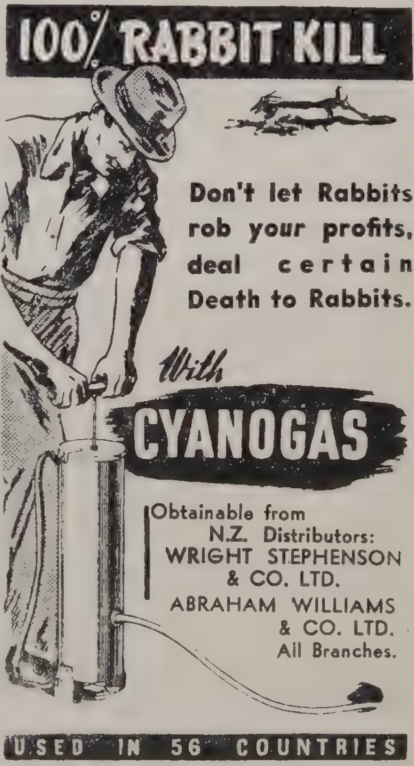
Water Content of Soil

Capillary water is the film of water surrounding each particle of soil and actually combines soil particles together to form crumbs of soil. These crumbs are held together by the surface tension of the water. Capillary water moves slowly to right and left or to the surface to even up the supply as it is drawn off by the root hairs of plants. Probably the greatest movement is towards the surface to replace the moisture lost by evaporation. Consequently, anything that can be done to form a mulch on the soil surface to check evaporation will conserve moisture. As the capillary moisture of the topsoil is used, more is drawn from the subsoil. The water-holding capacity of the subsoil as well as the topsoil determines the length of time before another irrigation is necessary.

Excess gravitational water saturates and percolates down through the soil between the soil crumbs and is usually lost in drainage or assists in forming the water-table found at varying depths below the soil surface. When the water-table is deep down there is no return of water by capillarity. If the water-table is near the surface, but below the limit of plant roots, there is a return of water by capillarity. If the water-table is very near or at the surface, it will seriously affect any crop through water-logging of the soil.

The amounts of water to use vary with the type of soil. A light or gravelly soil requires small and frequent irrigations to avoid too great a loss through drainage; a loamy soil will hold larger amounts of water for longer periods; a heavy clay type of soil has the best water-holding capacity. Frequently these clay soils have not a free drainage and care must be exercised not to over-irrigate them.

Apart from drainage and evaporation, there is a steady loss of water through transpiration of plants. Moisture is always travelling up from the roots through the stems and passing out through the leaves. For every 1lb. of dry matter produced some hundreds of pounds of water are used by the plant. Thus a steady supply of water from the soil through the plants is required to produce maximum yields. Any check in the water supply or a shortage of water will



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produce wilting or a check to plant growth, which will be reflected in a lowering of its production. An excess of water for any length of time will be equally detrimental to the plant in excluding air from the soil, air being necessary for root development.

Apart from the actual soil itself, bacterial content of the soil is a very important feature in the growth of healthy plants. A healthy bacterial growth plays a big part in soil fertility, its main function being the breaking down of humus into nitrogenous compounds. These bacteria live and thrive best under moist conditions in the presence of air. Consequently, if the land is too dry or too wet, the activity of the bacteria is slowed down or stopped, and under water-logged conditions undesirable bacteria begin to become active. Therefore, the irrigator must aim at keeping the land moist or wet, but not to the extent of excluding air from the soil for any prolonged period.

There are four distinct stages of wetness of the soil, with, of course, all the intermediate stages:—

1. Dry soil. This stage is below wilting point of plants; the land is too dry and hard to plough, or, if the plough can be held in the ground, the furrow turned consists of hard lumps of soil which require rain before they can be worked down.

2. The second stage is when the land is in ideal condition for ploughing and is above the wilting point of plants. The soil is moist and the mouldboard breaks up the furrow into a nice crumbly condition. That pleasant smell of Mother Earth is present, and the land requires very little working down to be ready for sowing.

3. The third stage is when the land is just too wet for ploughing. The suction of the water makes the ploughing hard pulling and the mouldboard puts a shine or polish on the furrow, but the crumb condition of the soil is still intact.

4. The fourth stage is the waterlogged or bogged condition of the land through over-irrigating or flooding. The soil crumbs break down into their finest particles, resulting in mud,

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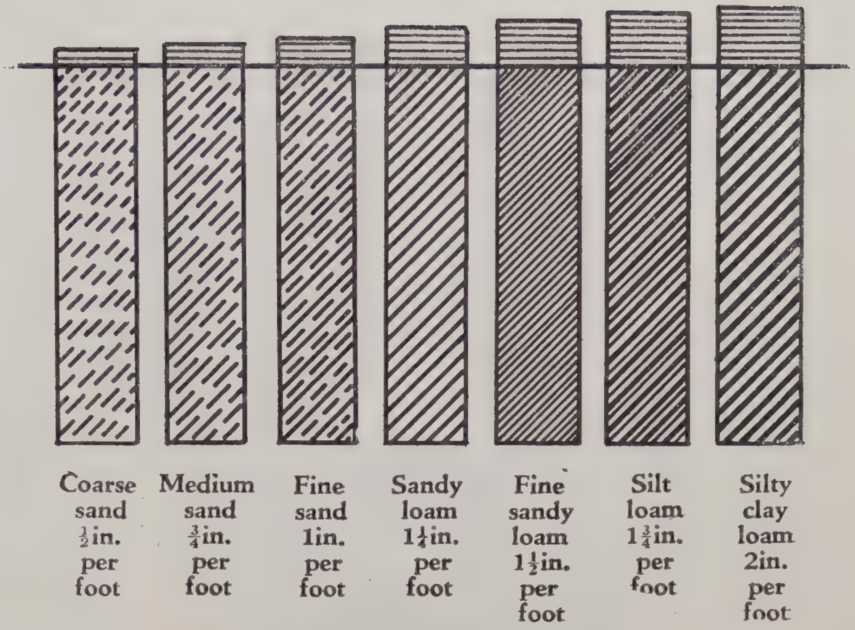
"WATER PUT TO WORK"

"Water Put to Work" is the title of a booklet just issued by the Public Works Department. It reviews the huge power and irrigation scheme in Canterbury and discusses the potentialities of the full utilisation of water in the vast open spaces of Canterbury and Otago. Copies are obtainable from the Public Works Department, Wellington.

which, on drying out, becomes very hard and cracks. Actually, the crumbly physical condition of the land is destroyed, and air is excluded from the soil.

The aim of every irrigator should be to keep the moisture content of his land between stages 2 and 3. A few hours after irrigating the land should be at stage 3, and when it returns to stage 2 one should prepare to irrigate again, always avoiding stages 1 and 4. In this way the moisture and air content of the soil is maintained in the best condition for the activity of the beneficial bacteria, a steady supply of soil moisture is maintained for transpiration through the plant, the physical condition of the land is held at its best while under irrigation, and over-irrigation with its attendant troubles is avoided.



Useable water capacity of different types of soil.

[After "Highway Magazine."

Estimating Applications

As the irrigator is supplied with a definite volume of water measured in terms of "cusecs" (1 cubic foot of water flowing every second) he should estimate the amount of water to be applied to his land in inches per acre, and at each irrigation give the land say, 2, 3, 4, or 6 inches of water per acre, whichever actual experience has shown that the land can absorb. "Acre inches" is the term used for inches per acre.

The following table will be of use in indicating the amounts of acre inches of water obtained when using different volumes for different times:—

Acre.	TIME REQUIRED TO IRRIGATE AN ACRE USING:—							
Inches.	1 cusec. hrs.	2 cusecs. hrs.	3 cusecs. mins.	4 cusecs. mins.	5 cusecs. mins.	6 cusecs. mins.	7 cusecs. mins.	8 cusecs. mins.
1	1	½	20	15	12	10	8½	7½
2	2	1	40	30	24	20	17	15
3	3	1½	60	45	36	30	25½	22½
4	4	2	80	60	48	40	34	30
5	5	2½	100	75	60	50	42½	37½
6	6	3	120	90	72	60	51	45
7	7	3½	140	105	84	70	59½	52½
8	8	4	160	120	96	80	68	60

1 day cusec = 23.76 acre inches.

The above table has been worked out assuming that 1 day cusec = 24 acre inches, which for practical purposes is quite satisfactory, and reduces the above equation to the simple unit value of 1 cusec for 1 hour = 1 acre inch. Thus, if one wants 4 acre inches of water, it can be obtained by using 1 cusec for 4 hours, 2 cusecs for 2 hours, 4 cusecs for 1 hour, or 8 cusecs for 30 minutes, and so on. What volume of water to use will depend on the porosity of the soil, the fall of the land, and the length of the border. After experience of irrigation one will arrive at a satisfactory time or volume with which to work. This sounds rather a complicated business, but actually it is not.

At each irrigation some allowance should be made for loss by evaporation, especially when applying the smaller amounts of acre inches. When using larger amounts loss by drainage of gravitational water should be watched for. Loss by surface drainage when using large volumes is probable where there is a good fall to the land. A proportion of the water may run off the area before soaking in. This is more likely to happen when the land is dry. In this case a smaller volume of water is used per border and run for a longer period.

Duty of water is the term used in defining the total amount of irrigation water used on the land to produce successfully any given crop. The duty of water is said to be high or low, depending on the amount of water used. On a given soil type and crop a high duty of water is obtained under careful and efficient management, or a low duty of water under careless and wasteful management where the consumption of water has increased.

Since so many factors come into play when determining duty of water, it is impossible to lay down any hard-and-fast rules regarding it. Apart from the different requirements of different crops, there are large varia-

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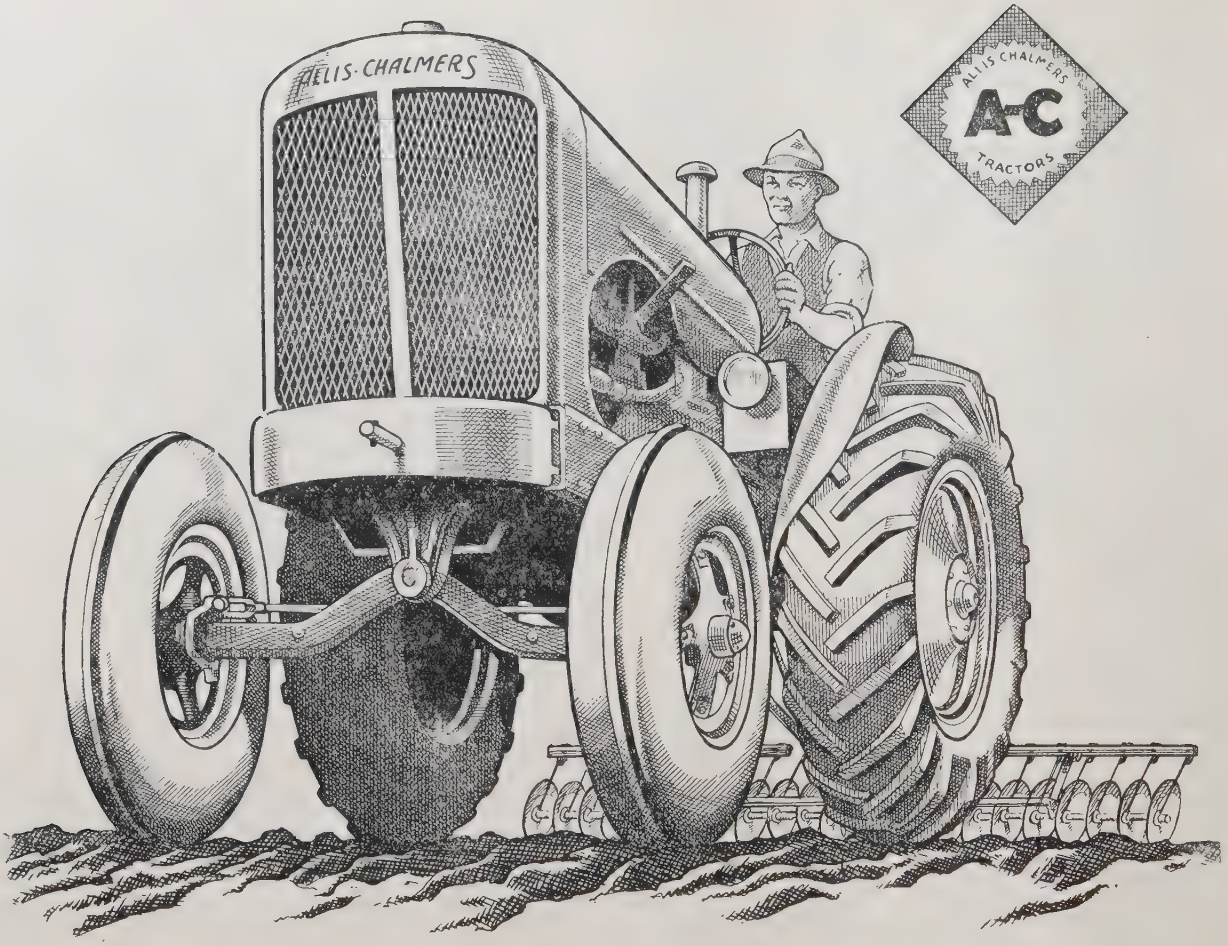

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tions in the water-holding capacity of the soils and subsoils themselves.

It has been stated earlier that soils composed of fine particles, i.e., clays and silts, can absorb and hold a definitely greater volume of water than soils composed of coarser particles such as fine gravels and sand. Consequently, the latter type requires more frequent but smaller irrigations than the former. Further, the depth of soil, the presence of a clay subsoil, or an open gravel subsoil, all necessitate using different amounts of water when irrigating to obtain a high duty of water.

With a good depth of soil a larger volume of water can be used and the surface soil saturated; there is a downward movement of water which, however, rises again by capillarity after the moisture near the surface has been used up. Where a pan or hard clay subsoil is present smaller quantities of water must be used so as not to bring about water-logged conditions. Where a gravel subsoil is present, with free drainage, there is no return of excess moisture by capillarity. Consequently, to get a high duty of water here only sufficient irrigation water should be used to meet the current requirements of the crop or the water-holding capacity of the soil, without penetrating into the shingly subsoil.

Evaporation from a wet soil surface is much faster than from a free water surface. The average loss from a free water surface at Alexandra for the three-yearly period 1933-35 was 31.7in. per annum. Since a loss such as this is often as much as and sometimes more than the irrigation water applied to the land, some measure must be taken to conserve the irrigation water. A grass, clover, or lucerne crop supplies a natural cover to stop excessive evaporation, but when a crop such as potatoes, mangolds, carrots, or maize is grown in drills the soil requires mulching. This mulching or loosening up of the surface can be done with a cultivator or horse hoe; it retards the capillary movement of the moisture to the surface and to a large extent checks evaporation. It was found by Tennent and Marks, working at Galloway, that where land had not received cultivation till eight days after irrigating the water lost by evaporation was in the vicinity of 2in. On adjacent land where surface cultivation had been carried out after irrigation the loss amounted in eight days to half an inch.

IRRIGATION PRACTICE IN MID-CANTERBURY.

For the first year or two the Canterbury irrigator may have difficulty in irrigating frequently enough without overdoing it to produce a steady growth of grass. The efficient utilisation of the feed produced may also be a problem, as he will not be dependent on the irrigated area alone for a living.

As the border dike method of irrigation is the most efficient system where the land is suitable, and, incidentally, the most costly system to lay out, it behoves the farmer to take some care in the sowing down, management, and utilisation of the area. It can be a truly permanent pasture, and should build up the fertility of the field over the years.

After a farmer has decided on the area to be bordered it should be ploughed and worked up. If twitch is present, extra workings of the paddock will be well repaid to clean it up. After bordering it should occasionally be worked up to keep down weeds, at the same time consolidating the land to produce the firm seed-bed so desirable for grass and clover seed.

The dikes may appear rather high on completion of the layout of the field, but they should not be worked down too low, as they will subside naturally and also wear down with sheep over the course of a few years. It is most probable that the land between the dikes will build up over the years, and the dikes that are high enough today may be too low in five years time. Some dikes have been rolled or consolidated by running the big wheel of the tractor down the dike, at the same time harrowing with a tine-harrow leaf on each side of the dike to smooth it down, thus facilitating the crossing of the dikes by implements. Another method is to roll the paddock across the dikes and then harrow along them. Whatever method is adopted, a final rolling across the dikes after sowing will put a good finish on them, bury any stones that may be present, and level off the land for mowing at any future date. The dikes should be left as high as possible, but not high enough to prevent implements such as haymaking machinery passing over them.

Time to Sow

The time to sow is about the end of February or, at the latest, early March. The main objection to sowing in the spring, apart from weed competition, is that although good germination is obtained, once the hot dry weather commences the seedling plants must suffer to some extent. Under steady north-west wind conditions many seedling plants will die, as it is not good practice to irrigate before the plants are fully developed if it can be avoided. If irrigation is carried out a month or two after sowing, the land, not being sufficiently consolidated to carry water, may bog to the depth of the ploughing, lose its physical condition, dry out hard, exclude air, and crack. Under these conditions it would be hard going for seedling plants. Even if the land has consolidated reasonably well, root development will not be as good when irrigation is done early and the plants obtain their moisture requirements easily, as when they are allowed to develop without irrigation.

If the young sward is given say 8 months or more to develop, as is the case with autumn sowing, before irrigating, the ground has had time to

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consolidate and carry irrigation water. Also, the plants have had time to produce a well-developed rooting system, which not only helps to hold the physical condition of the soil, but is better able to utilise the irrigation water than are plants with a less-developed rooting system.

Pasture Mixture

Where the pasture is intended for grazing or haying purposes only the following mixture is recommended as a guide for sowing on irrigated land:—

Certified Permanent Pasture ryegrass	20lb.
Timothy	4–5lb.
Crested dogstail	2lb.
Certified white clover ..	2–3lb.
Certified Perm. Past. Mont. red clover	1–2lb.

Timothy has been included in the above mixture, as experience has shown that it is an excellent grass under irrigation. It is very palatable, produces a large bulk of feed for both grazing and haying, and, apart from being specially suited for damp conditions, has probably the highest feeding value of any of the grasses. It is a true perennial.

One or perhaps two pounds of dogstail is quite useful in the mixture. It keeps the sward dense by filling up weak spots in it. It is particularly valuable in being an out-of-season grass, as it commences growth in the autumn and supplies some greenfeed in winter, while in late winter and early spring it is at its best before the other species have really commenced to come away.

White clover is shown as 2-3lb. per acre. If the land to be sown contains a fair proportion of white clover, 2lb. of the certified type will probably be sufficient. Although alsike clover is not included in the mixture, it is another clover that can be sown with advantage under irrigation, and, if obtainable pure, 1lb. per acre is well worth including. Some lines of white clover seed frequently have alsike in them as an impurity. Such lines can be sown with confidence under irrigation.

The 1 to 2lb. of Montgomery red clover is also added to the mixture partly for hay purposes, and as a palatable high-producing clover it adds variety to the mixture.

When sowing down a permanent pasture it should be given every chance to establish quickly with the least amount of competition from other plants. It is therefore a mistake to sow a few ounces of turnip seed per acre or a light seeding of rape. This appears to be a common practice, and under non-irrigated conditions in Canterbury this may be a sound idea to obtain a catch crop when the permanent pasture is going to open up a little in any case next summer. With an irrigated pasture a catch crop should not be necessary, and, in fact, can be harmful if the catch crop is a reasonably good one. The catch crop will probably be grazed irrespective of the condition of the young grass. If the autumn is wet, some poaching of the land may occur, apart from the smothering effect that a healthy rape or turnip plant must have on the pasture plants in the immediate vicinity. Since the turnip shells cannot be eaten, it takes many months for them to rot and for the space occupied by them to be in a condition for anything to grow on. Eventually there is left a number of small bare spaces for weeds, particularly Scotch thistle, to start in.

Harrowing Irrigated Pastures

With the heavy concentration of stock on irrigated pasture it is desirable, in fact necessary, to harrow the area periodically with light tine or chain harrows to spread animal droppings evenly over the field. This is best carried out after the stock have been shifted and before an irrigation is due. If this spreading is not carried out, it will result in tufts

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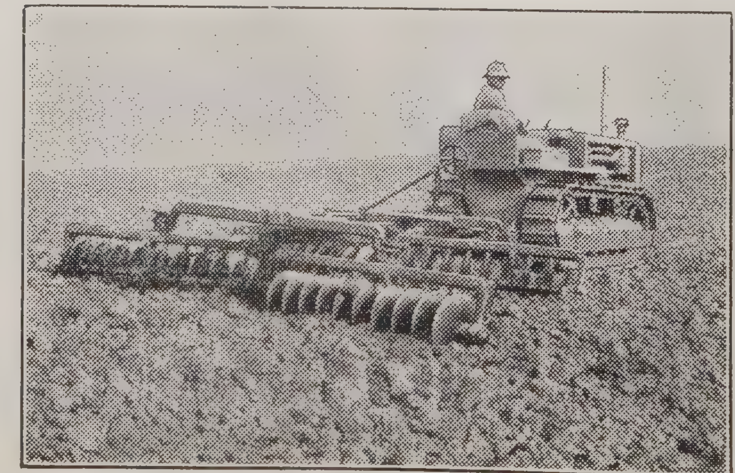

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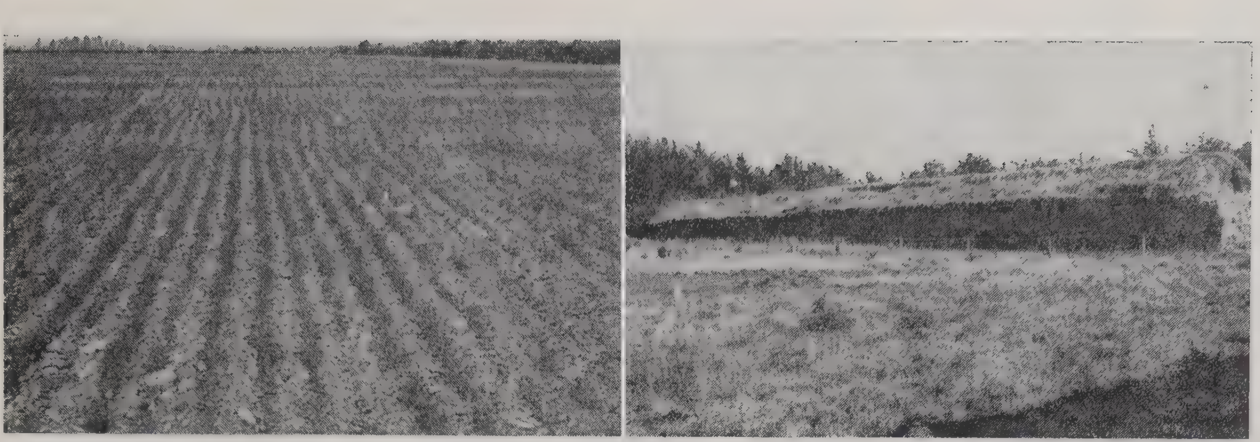

Left—Young lucerne stand ready for irrigation. Right—40,000 bales of lucerne hay from irrigated area.

of rank, unpalatable growth. Not only is the growth itself wasted, but also the manurial value of the droppings producing it.

After some years, when a solid turf has been built up, the paddock may tend to become sod-bound, when the use of a heavier or more drastic type of harrow will be required to penetrate and tear open the turf. This has an invigorating and rejuvenating effect.

Pasture Management

To obtain the maximum production and feeding value from the field growth should always be kept reasonably short. The growth can usually be kept down by stocking until the seed heads begin to make their appearance, when it may be necessary to top the paddock with a mower. For hygienic purposes a short pasture into which the sunlight penetrates is of considerable value in controlling internal parasites of sheep and also foot-rot; it also has a higher feeding value and productive capacity than long or rank growth.

For the production of grass growth frequent irrigation with maximum amounts of water is required to produce the maximum bulk of feed, but for seed production a minimum amount of water is required—no more than is necessary to keep the plants healthy. Under these conditions a quick and abundant flowering of the clovers is obtained, with a good seed yield. If more water is given, a profuse growth of stems and foliage is produced, while flowering is sparse and continues throughout the season. A large bulk of material is produced, and the seed crop is disappointing.

In growing for seed the sparing amount of water required even in a dry season and the fact that practically no water at all is needed in a number of seasons would indicate the advisability of using non-irrigated land for seed production, while pasture production can be concentrated on the bordered paddocks, with frequent irrigations. As the returns from grass and clover seed are rather attractive, a number of bordered areas could be sown down for this purpose and irrigation used only as a premium to guard against dry weather conditions burning up the crop.

A seeding of 25lb. perennial ryegrass, 3lb. white clover, and 2lb. dogstail will give a ryegrass crop the first season, with some white clover, and a white clover crop with some ryegrass during subsequent seasons. The addition of 2lb. dogstail will be of value for grazing purposes during the period that the area is not closed for seed.

For Montgomery red clover seed production a seeding of 10 to 20lb. certified perennial ryegrass and 4lb. Montgomery red clover should be satisfactory. The area can be grazed till towards the end of November, when it is closed up. If patches of rank growth are present after grazing, they should be removed with a mower to allow an even growth to come away over the whole area. If the area is not grazed, a light crop of hay can be taken towards the end of November, and the paddock then closed up. At the time of closing up the area a quick flush of water will give the clover a good start. Probably no more irrigation water will be required, unless the season is a particularly dry one, as the deep-rooting habit of the Montgomery red clover will carry the crop on to a successful seed-setting stage. Montgomery red clover in particular, under good growing conditions as supplied by irrigation, produces a large bulk of material which is slow in flowering, and is inclined to lodge and kill itself out if lodged for any length of time.

Lucerne Under Irrigation

The increased stock-carrying capacity obtained from the utilisation of an irrigated area on the farm necessitates the provision of increased winter feed, which can probably be best met by devoting part of the irrigated area to hay production. For this purpose lucerne probably takes pride of place. It will do well on practically all irrigated land; that is, land that has at least fair drainage. Where there is a water-table near the surface it must be some feet lower for lucerne than would be necessary for pasture.

The preparation of the seed-bed is similar to that required for grass or clover. Sow seed in the autumn towards the end of February on a firm seed-bed, which, unless it has been recently limed, should have at least ½ to 1 ton of lime per acre applied to it. About 14lb. of inoculated seed per acre is a reasonable seeding, although up to 18lb. per acre is sown by some farmers. If the seed-bed has been well prepared and no seed buried deeper than ½in. or so, less than 14lb. will give a good stand.

The seed can be either drilled in 7in. rows or broadcast. With broadcasting there is not the danger of burying the seed too deeply and the seed is distributed over the field more evenly. However, there are some excellent stands of drilled lucerne, and under dry conditions a better strike will probably be obtained by drilling the seed.

The Marlborough strain or any seed produced in New Zealand is preferred to imported seed, although most of the lines from South Africa and Australia, particularly the Hunter River strain, have proved quite satisfactory. Some of the Canadian lines are later than the above in coming away in the spring.

The first irrigation will probably be in the early summer following sowing. The first cut will be taken when either 5 to 10 per cent. of the crop is in flower, when the bottom leaves of the crop are commencing to turn yellow in colour, or at the first sign of new growth commencing to come away from the crowns of the plants.

If the land is getting dry towards the time of cutting, irrigate the area and harvest the crop as soon as the land is sufficiently firm to carry harvesting implements. This ensures a quick new growth immediately the crop has been removed. If the land is reasonably moist, the irrigation is better delayed until the crop is removed. Under good drying conditions the crop can be cut one day, teddered the next, and baled the following day, although this is not always possible with the first cut. Many Central Otago farmers make their first cut into ensilage. The ensilage is valuable for feeding in the late winter or early spring just before lambing or calving commences.

Probably three good cuts and a fourth lighter one can be expected under Mid-Canterbury conditions.

Montgomery red clover is coming into favour with some farmers for hay production, mainly due to the fact that it is a more versatile crop than lucerne. The time of cutting can be more varied than with lucerne without deterioration of the crop, and the clover can be utilised for grazing or for seed production purposes much more easily than can lucerne.

However, with an area of lucerne one will always have hay, which is the main purpose in growing it, while with Montgomery red clover, apart from the point that it takes more drying out than lucerne and may kill itself out by lodging, one can become short of hay by using the crop for some other purpose.

The above has been written in the hope that it will be of use to those Mid-Canterbury farmers who are this year commencing irrigation farming for the first time, and thus save them from mistakes which are possible through lack of knowledge or experience.

This statement is not considered to be anything like a complete work on irrigation, nor are the principles outlined expected to be consistently exact when applied to Mid-Canterbury conditions, as these have yet to be learned by experience and study. However, in conjunction with the farmer's local knowledge of his own farm and his own conditions, it is expected that the foregoing will aid him for the first season or two by explaining some of the basic principles of irrigation practice. Ultimately his own experience and ready adaptability will give him confidence to go ahead and exploit to the full the possibilities of irrigation.

Officers of the Fields Division of the Department of Agriculture at Ashburton may be consulted on irrigation problems.

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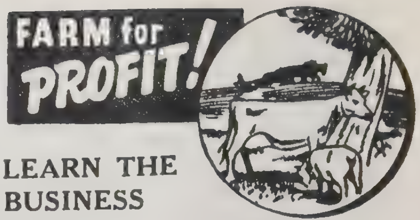

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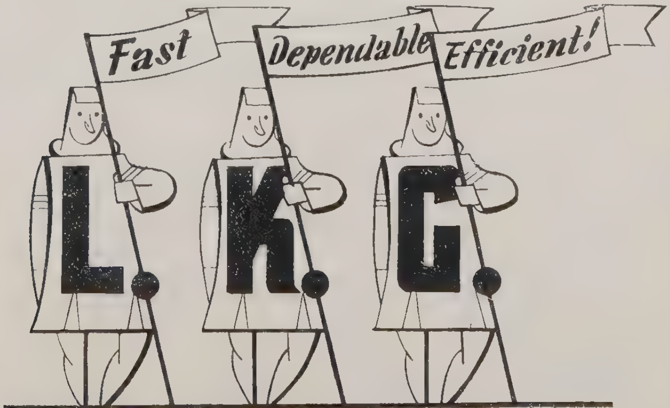
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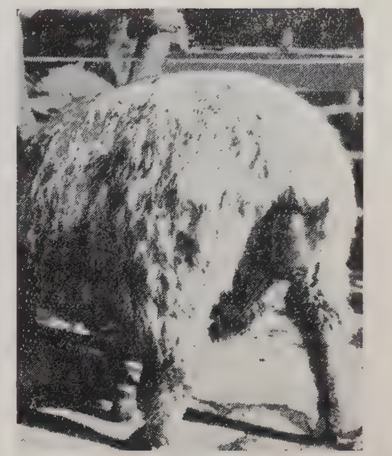
"Sleepy Sickness" and Bearing Trouble in Ewes

Prevention by Suitable Methods of Management

"SLEEPY sickness" (ante-partum paralysis) and bearing trouble together account for a very large proportion of the mortality and indirect loss in ewes at lambing time. In certain districts, for instance, the average incidence of bearing trouble may amount to 4 per cent., about half the ewes affected either succumbing or having dead lambs. As both these troubles are due to causes connected with nutrition, it will be profitable to consider certain aspects of the treatment of pregnant ewes.



A typical case of bearing trouble.

By
A. D. G. M. LAING, M.R.C.V.S., *Veterinarian, Hastings.*

THE essential factor to be borne in mind in the management of in-lamb ewes is that just as milking cows require so much feed for the maintenance of their bodily requirements and so much more for milk production, so does the pregnant ewe require so much to keep herself and so much more to develop the one, two, or even three lambs she is carrying. The important point, however, is that in-lamb ewes do not require nourishment in an evenly-increasing ratio. Their needs are comparatively small during the earlier part of pregnancy and disproportionately heavy towards the end.

Investigations have proved that most of the foetal growth takes place during the last third of the period of pregnancy. In the case of the ewe it may in fact be stated that during the last five weeks of pregnancy she is called upon to provide half the total growth requirements of the lamb or lambs she is carrying. It is obvious, therefore, that special care should be taken to provide nourishing feed during the month prior to lambing.

ANTE-PARTUM PARALYSIS.

The more correct name for ante-partum paralysis, or sleepy sickness, is pregnancy toxaemia (toxaemia meaning poisoning). It is also sometimes known as twin lamb disease, from the fact that in 95 per cent. of cases the ewe is found to be carrying two or more lambs. Its incidence is world-wide, and in New Zealand the losses in most seasons are appreciable, and in some years serious. It appears to be associated with a feed shortage occurring during the latter part of pregnancy. Heavy frosts and dry spells in spring, factors which result in a feed shortage at this period, should both be looked on as predisposing causes, and precautions taken accordingly by those who have the handling of the ewe flock.

In order to give a clear picture it is necessary to give a very sketchy description of the extremely complicated process by which the sheep converts pasture into flesh and blood, etc. A balanced proportion of the three main food factors, proteins, fats, and carbohydrates, is required. These are all broken down by the digestive juices and action of the liver into simple substances, waste products being excreted.

These simple substances are carried by the blood fluid to the muscles and there "burnt up" with the oxygen absorbed from the lungs, the resulting heat being the energy by which the body lives. A number of minerals, phosphorus, calcium, iodine, etc., are also essential to life and to the satisfactory working of the processes outlined above. It must be emphasised that the liver plays a very essential part.

When food intake is in excess of bodily requirements the surplus is stored as fat. If the daily food is insufficient, then the fat reserves are called into use. The liver is the organ by means of which the body reserves of fat are converted into the simpler substances, in which forms alone they can be made use of to support life. In the pregnant ewe the position is further complicated by the heavy requirements of the foetus during the last month of pregnancy, and the several factors result in inefficient functioning of the liver, the formation of injurious substances in it, and the setting up of a condition of toxaemia or poisoning. Ante-partum paralysis has on a number of occasions been caused experimentally in pregnant ewes, and blood and other tests have confirmed the above conclusions.

Symptoms

The symptoms occur at 10 to 20 days before lambing is due. The ewe is dull, off feed, and keeps separate from the flock. The earliest noticeable sign is frequently a loss of control over the limbs. When driven, the ewe will trip up or cross her forelegs. Later, she will stand stupidly and be moved only with difficulty. The eyes appear glazed and sightless. She may stagger or walk in circles.

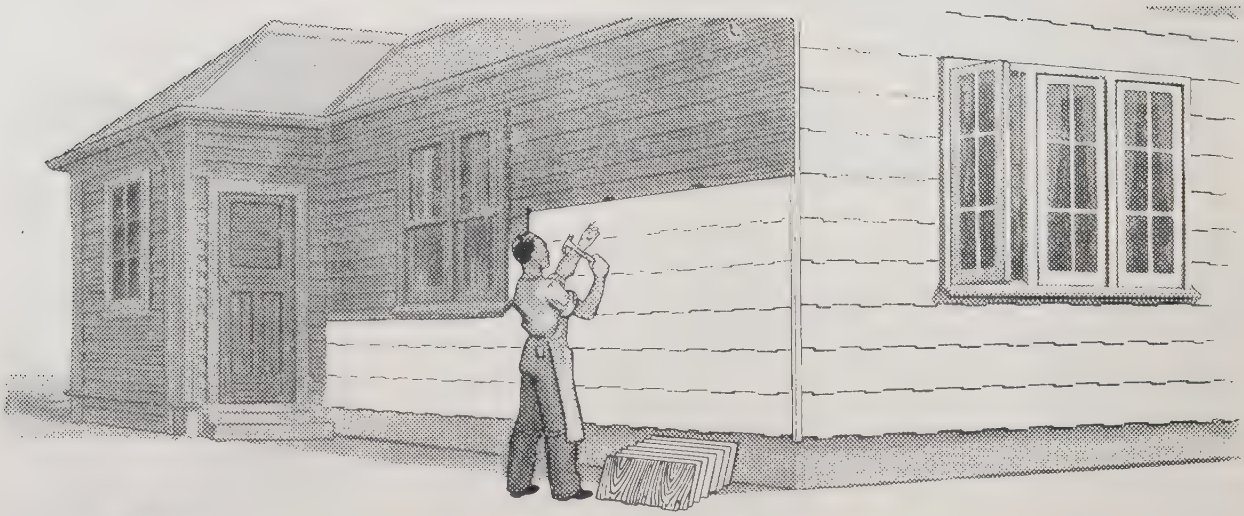
As the condition gets worse the ewe lies down, and if raised to her feet, collapses again after walking a few paces. She may live for several days in this condition, death occurring in a few days from when the earliest symptoms appeared.

Appearance of Organs

The general condition of the organs after death is good. The lamb or lambs in the womb appear quite healthy. The liver, however, is quite abnormal, being enlarged, pale, yellow, very easily broken, and greasy. Some of the internal fat may have a patchy, parboiled appearance.

Treatment

Nothing can be done once the case is far advanced, because the liver has



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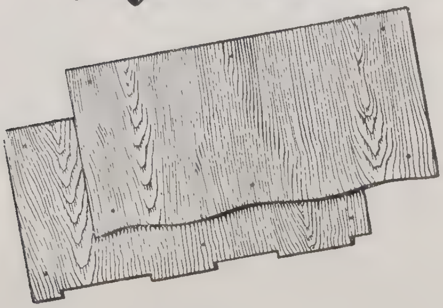

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.... "D" become completely useless. In the early stages, however, while there is a desire for food and the ewe can move about, dosing with ½lb. of molasses or syrup, repeating daily, gives a good chance of a cure. In the case of valuable stud ewes the expense of treatment by a veterinary surgeon with insulin and glucose may be justified, and good will usually result. If the ewe lambs, the symptoms will disappear. The important point, however, is that the affected ewe should be able to graze, and as long as that is the case treatment on the above lines has a good chance of being successful. It is essential that ewes under treatment be put on succulent feed, such as young grass or green barley.

Care of Affected Flock

Every effort should be made to supplement the feed of a flock in which cases of sleepy sickness occur or are suspected. Good-quality hay, preferably legume, and succulent greenfeed, such as young grass or barley, should be made available if possible. In cases in which the flock is in high condition daily exercise appears to be of considerable value, both in itself and because the presence of affected ewes may be disclosed by their tripping up when driven, so that they may be picked out in the earliest stages for special treatment. A good plan is to muster the affected mob daily and drive them slowly for half a mile to a mile to good pasture and back again after one or two hours, but the exercise must never be carried to the extent of interfering with nourishment, as that will bring on the condition it is desired to prevent.

Prevention

No deficiency of calcium or other mineral has been diagnosed in sleepy sickness. A calcium deficiency does occur in lambing sickness, which is a different disease, and one which occurs much more rarely than sleepy sickness. Lambing sickness, being a form of milk-fever, yields readily to calcium gluconate injections, but in the much more common sleepy sickness such injections are of no value. Prevention, therefore, is best sought by common-sense and general care of the flock.

1. Ewes should be in good condition, but not fat, at tupping time.
2. If any shortage of feed is anticipated, it is better that it should occur, as far as is practicable, during the earlier rather than the latter part of pregnancy (note the disproportionate foetal requirements during the last month). **The old idea of allowing the ewe to "live on her own fat" during the latter part of the winter is indeed one of the principal factors in bringing on sleepy sickness.**
3. The ideal is that ewes should rise slowly in condition from tupping to lambing, farm management being directed to that end. Such a policy will ensure a minimum of casualties and a maximum milk supply for the lamb.
4. Where paddocks are not topdressed a lick composed of equal parts of bone meal or bone flour and salt should be made available.
5. To enable the above policy to be carried out it is essential that reserves of winter feed be carried from year to year to offset uneven pasture growth in certain years and seasons.
6. If it appears that winter feed may be insufficient, it is far safer to keep the ewe flock short during the earlier part of the winter and do them well during the latter half and in early spring, than the other way about.

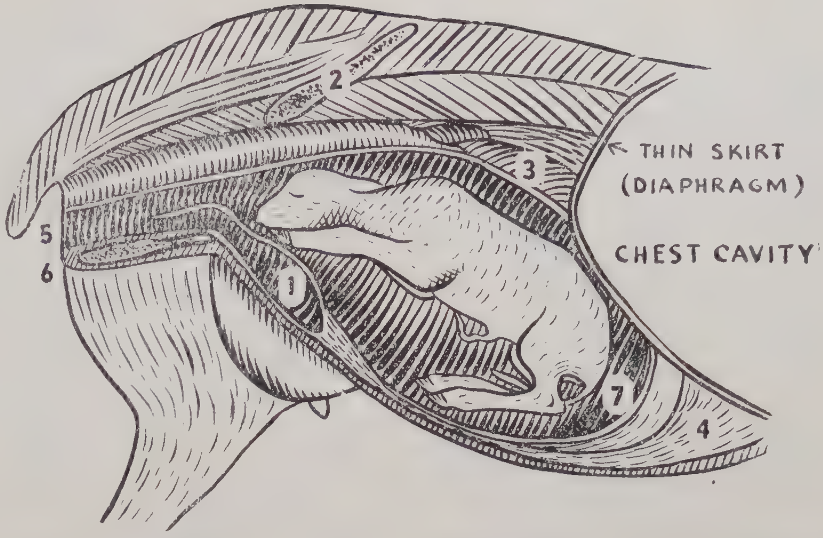

Diagram of a pregnant ewe subject to bearing trouble. Note the full bladder, and its proximity to the aitch bone and the womb above. 1. Bladder. 2. Portion of pelvis. 3 and 4. Viscera. 5. Vaginal orifice. 6. Aitch bone. 7. Womb.

BEARING TROUBLE IN EWES.

The more correct name for bearing trouble in ewes is eversion of the vagina. The term "red bag" is frequently used, arising from the appearance of the everted membrane. The condition can occur in any of the domestic animals, and does do so to a rare extent everywhere, both shortly before and shortly after parturition.

The epidemic form some days before lambing occurs in New Zealand in seasons which favour its development. The trouble appears to have come to notice fairly early in the history of New Zealand farming, but it was only about 1890 and in the early years of this century that it became widespread. While a small proportion of cases occur in dry ewes in poor condition, in the great majority the ewe is pregnant and in good order.

Symptoms

Symptoms occur about seven days, although often longer, before the ewe is due to lamb. The protrusion of the membrane lining the vaginal pas-

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sage from the vaginal orifice in the form of a large, reddish swelling is the first sign. The ewe is listless and uneasy, grazes little, and tends to separate herself from the flock. The swelling increases with time, both from straining on the part of the ewe and from the accumulation of blood in the extruded part. If it is not treated, inflammation sets in, the ewe cannot make water, and death ensues. Occasionally the "bearing" will return of its own accord, especially in those cases occurring in dry ewes.

The vast majority of affected ewes are 4-tooths and 6-tooths and upwards, and it is rare in 2-tooth ewes.

Organs After Death

There is usually much abdominal fat present in the organs after death. The liver is pale and greasy. In 90 per cent. of cases twin lambs are being carried. The bladder is enormously distended with urine.

Cause

This condition is due to incorrect nutrition. The immediate chain of circumstances is:—

1. The ewe has been carrying too much condition, and the muscles are soft and lack "tone."

2. The flock is rarely disturbed and feed is plentiful, but inclined to be rank.

3. The ewe lies down to ruminate for long periods, during which the bladder fills up.

4. She gets up to urinate only when the bladder is full. It may be noted how invariably such sheep, when disturbed, immediately make water.

5. In all animals, when the bladder is excessively full, a nervous contraction of the neck will take place, preventing the act of urination for a few seconds.

6. The ewe then strains to bring about urination. Straining consists of a contraction of the muscles lining the abdomen, etc.

7. This contraction forces the organs backwards into the pelvis.

8. The paunch is full, feed being plentiful, and the womb is gravid, usually containing two foeti. Much abdominal fat is present. All these factors increase the pressure mentioned below.

9. The neck of the bladder is pressed against the aitch bone by the abdominal organs coming backwards from the straining.

10. Should the ewe attempt to make water when lying down, the tendency to close the bladder is still greater.

11. The ewe is now in a "vicious circle": the more she strains to urinate the more effectively is the neck of the bladder closed, and the longer the bladder is closed the greater is the straining to make water.

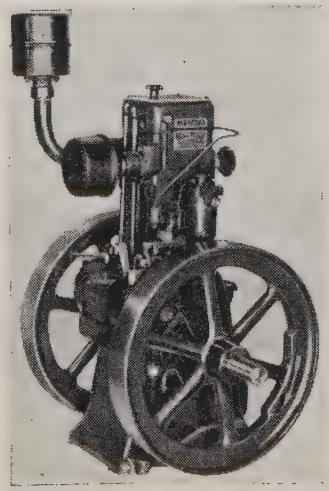
12. Eventually the vaginal lining is forced out to the exterior, which is the condition of "bearing" out.

Treatment

If the ewe can be treated before the extruded membrane has become congested, injured, or filthy, a good percentage of cures can be obtained. The not uncommon cases of relapse after lambing should be watched for and treated on the same lines.

The part should be gently cleansed. Condy's crystals at a half-teaspoonful to a gallon of water, freshly prepared daily, is recommended, or any of the well-known coal-tar antiseptic preparations at suitable dilution. Strong or irritant antiseptics must be avoided, as they cause straining.

For the operation of replacing the membrane the operator's hand and forearm must be clean and the nails short and even, and they should be smeared with carbolised oil. The



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vaginal membrane can then be returned into place, keeping it in position with the hand until it is warm and the blood has begun to circulate.

Administration by the mouth of one drachm of chloral hydrate (this can most easily be given in a small-size gelatine capsule) will help to prevent the ewe straining and forcing the bearing out again. One ounce of a weak solution (2 per cent.) of bluestone should be given with the capsule to ensure its passing straight into the fourth or true stomach. Raising the hindquarters will also materially assist. When the operation is completed two or three locks of wool should be tied across the vulva to help to retain the membrane in place. Stitching, safety pins, and other materials to pin the lips of the vagina together are best reserved for chronic cases of relapse of the trouble. A piece of an old tyre inner tube 4in. square with a small hole for the escape of urine and tied by binder twine to the wool on the flanks is also helpful.

An old method, crude but effective, in the early stages was to secure the ewe to a wire fence for a few hours, so that the hindquarters were well off the ground, care being taken that there was no risk of suffocation from pressure of the paunch on the chest. The womb slips forward, the ewe makes water, and when the animal is liberated the bearing remains in.

On no account should materials such as bran or short wooden sticks be placed in the vagina to retain the bearing mechanically. Such remedies may seriously injure the ewe and are, in any case, of little value.

Prevention

Outbreaks of this trouble occur after a mild winter, when food has been plentiful and the pastures rank in growth, and when the ewe flock as a whole has been in too high condition. For example, in 1908 and again in 1938 in Hawke's Bay the rainfall from January onwards was far in excess of the average and the seasons very mild, with resulting tremendous growth of pasture. In both these years the incidence of "bearings" was very much higher than usual, while those seasons in between in which there has been a high incidence of bearings have shown similar climatic and general conditions on a somewhat milder scale.

Prevention is on common-sense lines, that is, as mentioned earlier in this article—ewes to be in good condition, but not fat at tupping time, and to have sufficient feed to keep them rising slowly in condition throughout pregnancy, allowance being made for the disproportionately large requirements of the foetus during the last month.

Where feed is plentiful and the ewe flock appears lazy, if the ewes are mustered quietly once daily and given a change of pasture and gentle exercise for one to two hours, the trouble will be largely prevented. The object of the exercise, of course, is to keep the muscles, as well as the general system of the ewe, in good "tone."

General

The following is a quotation from a standard text-book in regard to this condition (eversion of the vagina) in the cow:—

"This accident may occur in well-shaped cows whose tissues, and especially those of the genital organs, are soft and relaxed—animals of a lymphatic temperament, with a wide pelvis, and which are fed on an abundance of bulky but not nutritious food."

It is certainly the short, blocky ewe with the wide pelvis which is the most liable to put out her bearing, and the parallel case in the cow is of considerable interest. In the cow it is rare also at first calving.

Summary

1. Ante-partum paralysis and "bearings" between them cause much the greater part of the annual ewe mortality.
2. The causes of both are nutritional and they are preventable by suitable methods of management.
3. To overcome climatic variations reserves of supplementary feed, hay, ensilage, etc., should always be available. The two first-named can, of course, last for years until required and need not be touched in good seasons.

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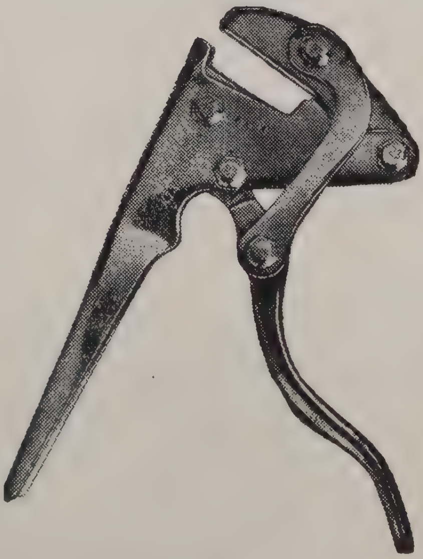

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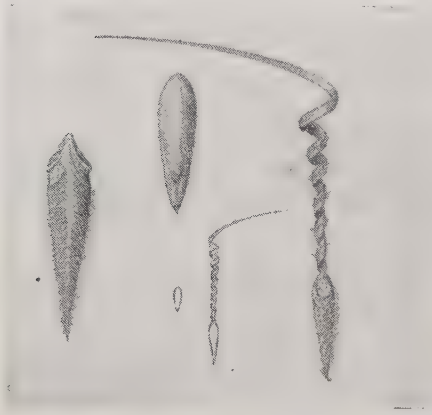
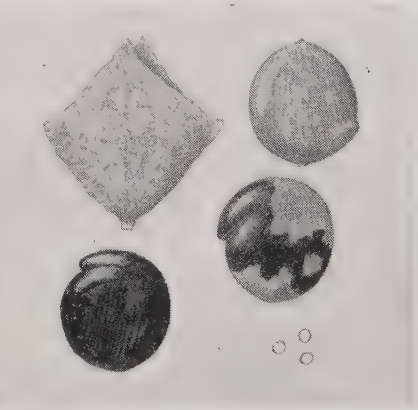
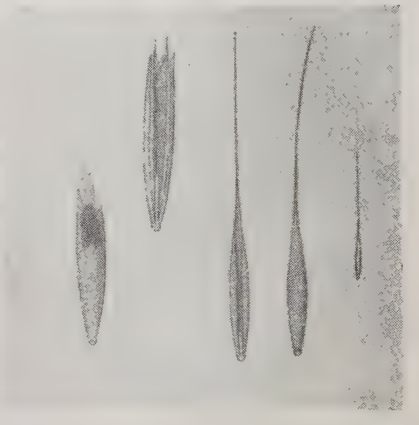


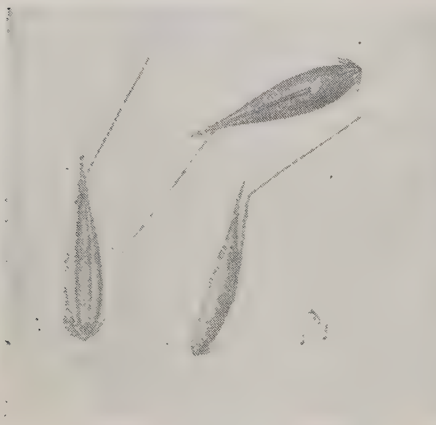
ERODIUM CICUTARIUM: STORKSBILL. Pericarp and beak brown; seed grey. Occurs rather infrequently in ryegrass and cocksfoot and in red clover. Australia admits not more than 100 seeds per ounce. An annual or biennial weed of pastures on light land. It is readily eaten by sheep and is not without value under very dry conditions.



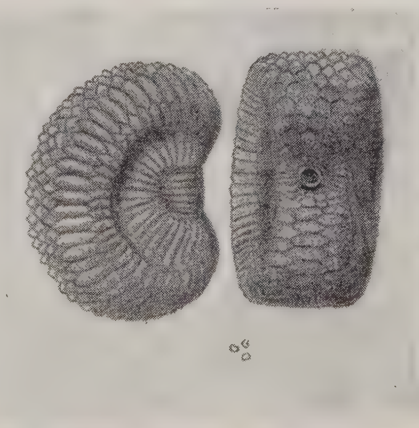
ATRIPLEX PATULUM: COMMON ORACHE. Pericarp grey, seed black. The striations of the pericarp are transverse, whereas those of *Chenopodium album* are radial. Occurs with medium frequency in red clover and lucerne. Australia admits not more than 50 seeds per ounce. An annual weed most common in coastal regions, but abundant on cultivated land in some inland localities.



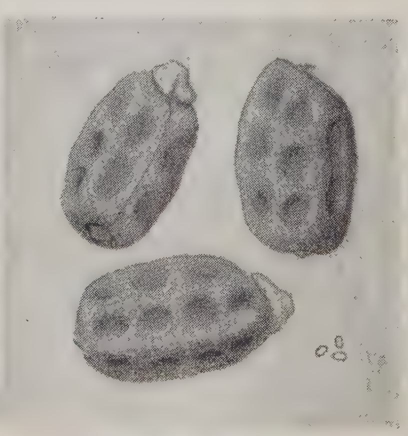
VULPIA DERTONENSIS (FESTUCA BROMOIDES): HAIRGRASS. Colour light brown. Occurs frequently in chewings fescue and ryegrass, usually with the awn broken away. It is also a common impurity in *Danthonia pilosa* seed. An annual weed often abundant in pastures and crops on light land.



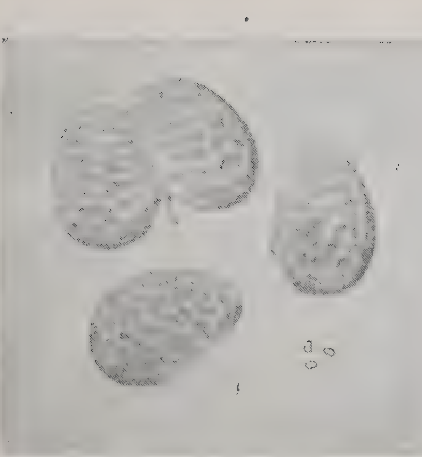
AIRA CARYOPHYLLEA. SILVER HAIRGRASS, ENGLISH HAIRGRASS. Colour dark brown. Occurs frequently in crested dogstail seed. An annual grass often abundant in pastures on very light dry land.



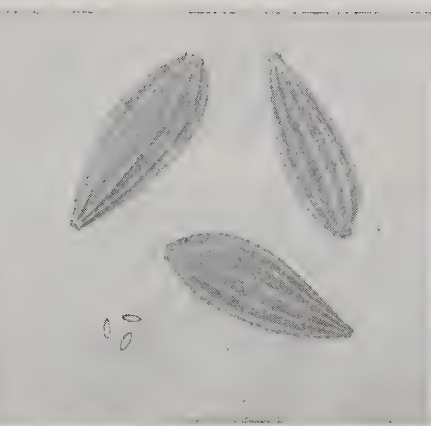
SILENE GALLICA: CATCHFLY. Colour black. Occurs frequently in white clover seed. Australia admits not more than 100 seeds per ounce. An annual weed of cultivated land and pastures.



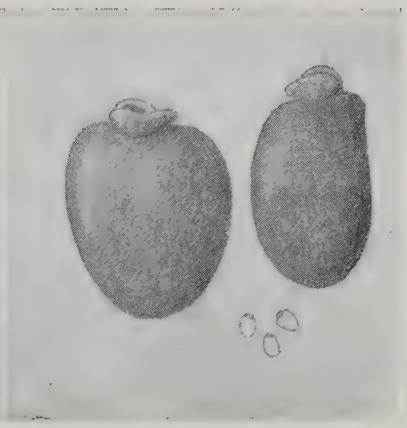
EUPHORBIA PEPLUS: MILKWEED. Colour light grey. Occurs rarely in white clover. Australia admits not more than 50 seeds per ounce. An annual weed most common in gardens.



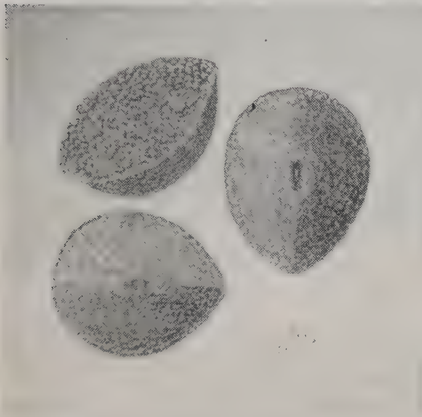
CORONOPUS DIDYMUS: HOG-CRESS. Colour yellow to grey. Occurs frequently in white clover seed. Australia admits not more than 100 seeds per ounce. An annual weed of cultivated land and open pastures.



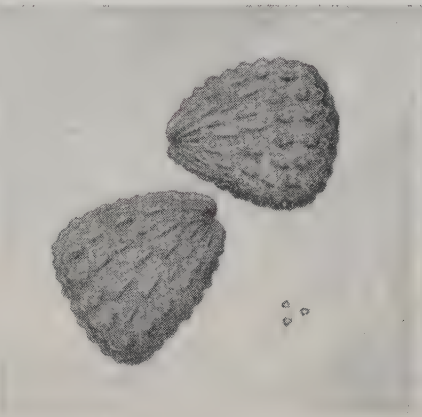
SONCHUS ASPER: PRICKLY SOW-THISTLE. Colour light brown. Occurs with medium frequency in cocksfoot and crested dogstail. Australia admits not more than 100 seeds per ounce. An annual weed of cultivated land.



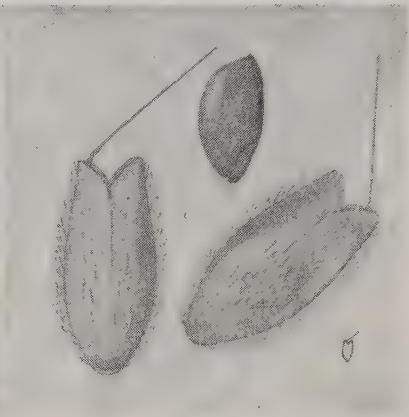
CYTISUS SCOPARIUS: SCOTCH BROOM. Colour olive green to brown. Occurs infrequently in cocksfoot seed. Australia admits not more than 50 seeds per ounce. A shrub common on waste land and occasionally invading pastures.



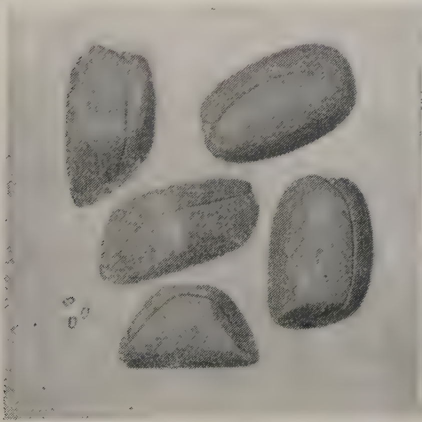
ANAGALLIS ARVENSIS: SCARLET PIMPERNEL. Colour dark brown with ridges or scale-like excrescences of lighter colour. Occurs frequently in white clover seed. Australia admits not more than 200 seeds per ounce. An annual weed of cultivated land and open pastures.



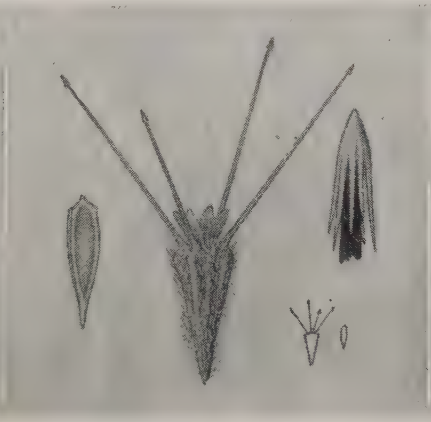
CERASTIUM VULGATUM: MOUSE-EARED CHICKWEED. Colour brown. Occurs frequently in browntop. In Canada classed as a secondary noxious weed seed when occurring in seed of turf and forage grasses. An annual or biennial weed common on cultivated land and in pastures.



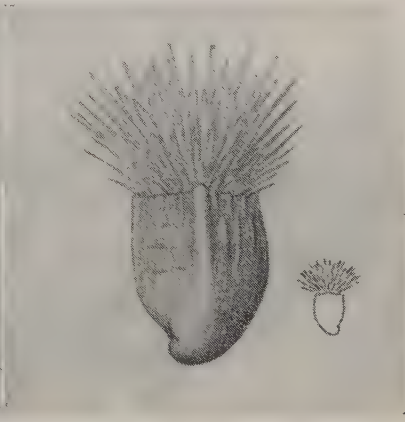
ALOPECURUS GENICULATUS: FLOATING FOXTAIL, or KNEE-JOINTED FOXTAIL. Colour light to dark grey. Occurs with medium frequency in crested dogstail and cocksfoot. The caryopses are not uncommon in white clover. A perennial grass often abundant in wet pastures.



SISYMBRIUM OFFICINALE: HEDGE MUSTARD. Colour brown. Shape highly variable. Occurs with medium frequency in white clover, and in grain imported from Australia. Australia admits not more than 20 seeds per ounce. An annual or biennial weed of cultivated land.

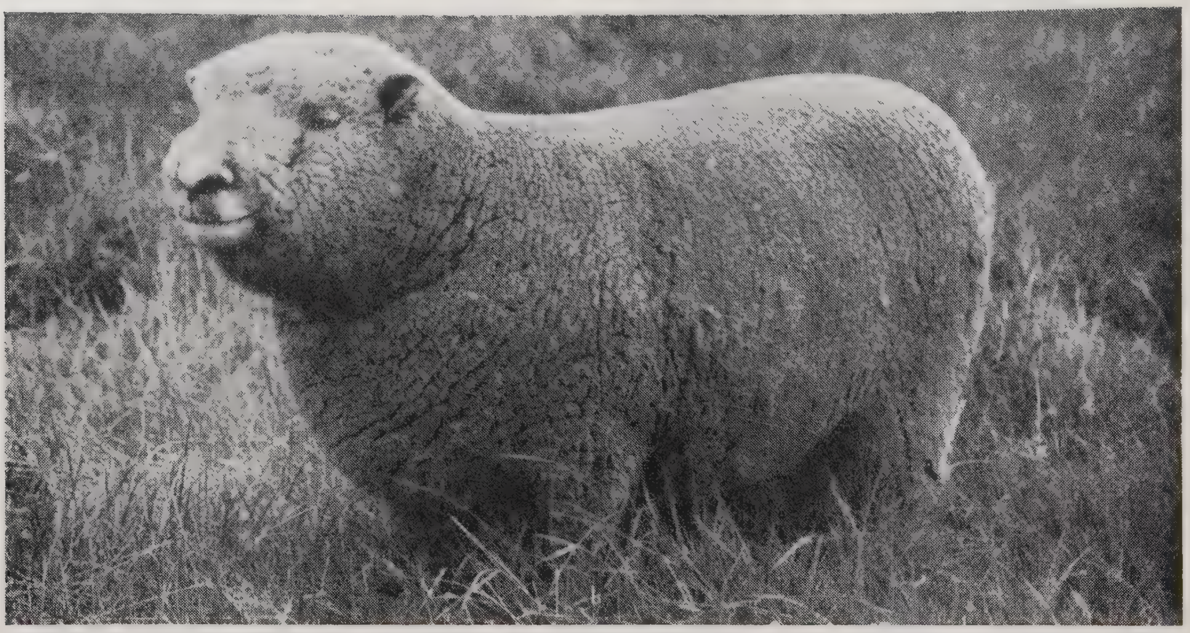


ACAENA SANGUISORBAE: PIRI PIRI, BIDI-BID. Colour brown. Occurs infrequently in *Danthonia pilosa*, crested dogstail, and cocksfoot. A native perennial weed of pastures, especially objectionable because of the burr-like seeds which spoil wool.



CARTHAMUS LANATUS: SAFFRON THISTLE. Colour light yellow or purple. Occurs with medium frequency in grain imported from Australia. Australia prohibits importation. An annual weed occasionally found on cultivated land in the North Island.

BRED, FED and RAISED ON WONDER



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D.D.T.—

a New Insecticide

MUCH public interest has been aroused by references in magazine articles and newspapers to the development and use during the war years of a new and effective insecticide known as D.D.T. The name is an abbreviation of the chemical name dichloro-diphenyl-trichloroethane. D.D.T. is a synthetic organic chemical—that is, it is not produced from natural sources, but is made by the interaction of other chemicals, in this case chloral and monochlorbenzene.

By

L. J. DUMBLETON,
Entomology Division,
Department of Scientific and Industrial Research.

ACTUALLY it is only one of hundreds of such synthetic chemicals which have been tested before and during the war for insecticidal properties. It is perhaps the most promising of these, but a few others show almost equal promise.

It is not a new material, since it was first made in Europe about 1872, but its insecticidal properties remained unknown or unexploited till about 1942.

D.D.T. is a white powder, not soluble in water, but soluble in various organic solvents such as kerosene, diesel oil, acetone, and alcohol, etc. It is very slightly volatile. It is used as a spray dissolved in oil, as an emulsion in water, and as a dust mixed with inert material such as talc.

Value in War

Attention was focused on it because of the promise it gave as a substitute for other insecticides which were in short supply because of war conditions. Some of the major insect enemies of armies are lice, mosquitoes, and flies, all of which carry diseases capable of putting an army out of action. The louse, carrier of typhus, is a great problem in static warfare, and in civil populations in times of famine, and the need had long been recognised for a powder which would kill lice when dusted on the body and clothing. D.D.T. surpasses in efficiency all previous powders. In the control of mosquitoes, which carry malaria, yellow fever, and dengue fever, D.D.T.'s high toxicity and the fact that it required only a small quantity of oil to act as a carrier proved a godsend. With the use of the aeroplane for applying very fine mist-like sprays of D.D.T. in oil which killed both adult and larval mosquitoes, it became possible greatly to reduce mosquitoes in large areas of otherwise inaccessible and difficult country. Against flies, the persistence of the poisonous residues left on walls, etc., after spraying made it very useful in keeping down such diseases as dysentery. It does not, however, knock the flies down as quickly as pyrethrum (the active ingredient in other fly sprays), but D.D.T. and pyrethrum together make an ideal combination. Similarly it has proved effective against cockroaches and bedbugs.

Great Persistence

This persistence of D.D.T. is one of its most striking and valuable characteristics. It will kill flies and other insects which walk on a sprayed surface two or three months after the spraying was done. This property has also proved useful in impregnating clothing with D.D.T. as a defence against scrub mites or itch mites, which carry scrub typhus. Such treated clothing remains effective even after several washings.

It is in the field of disease-carrying and household insects that D.D.T. has proved its value beyond doubt. In combating agricultural insects it has been shown to have great promise in some cases, but not in all, and much further work will have to be done before it can be used on all plants without danger of injury to the plants or to man or the animals feeding on them. Another field in which it shows promise is that of dips or sprays for animals, against lice, ticks, etc. Its usefulness as a timber preservative, its incorporation in paints and polishes, its use as a moth proofing for fabrics remain to be explored.

On the debit side there is its undoubted toxicity to man, both when taken by mouth or in oily solutions absorbed through the skin. It is not, however, any more dangerous, if ordinary precautions are taken, than some insecticides already in use. D.D.T. acts on insects as a nerve poison, destroying their muscular coordination. Its widespread use on fruit trees and crop plants may have the effect, already observed, of killing off large numbers of beneficial insects which are predators or parasites on pests. Similarly its use could have disastrous effects on hive bees and humble bees frequenting blossoms sprayed with D.D.T.

These questions do not arise yet in New Zealand, since all the present output of D.D.T. is required for disease control in war theatres and devastated areas, although it is expected that supplies will be available at an early date for special civilian purposes.

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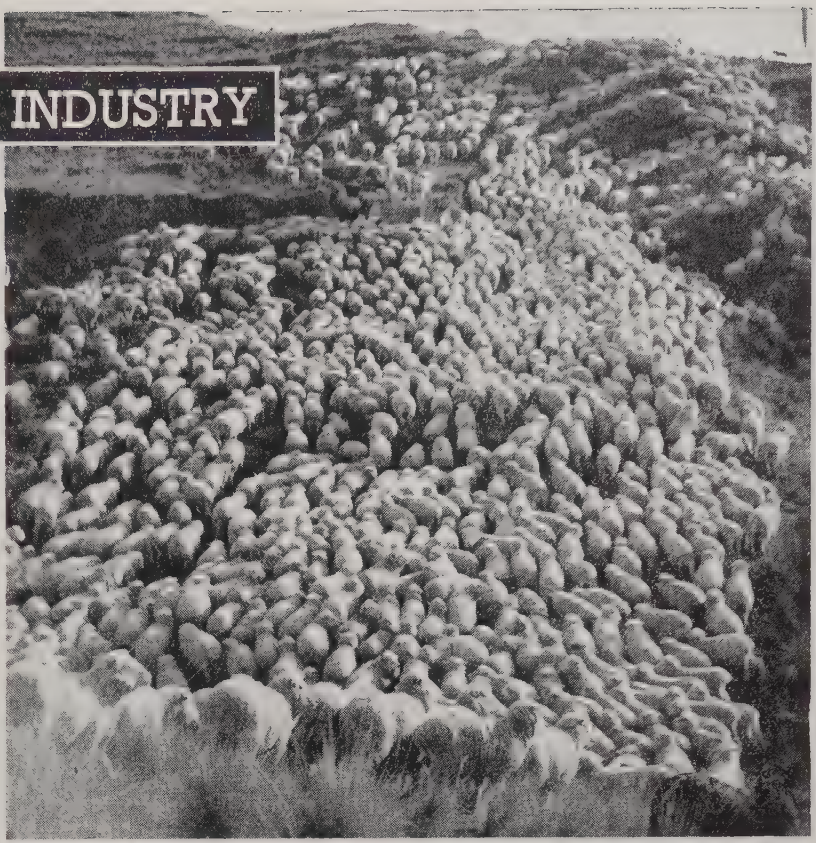
THE SHEEP INDUSTRY



THE first sheep to reach New Zealand were two Merinos landed by Captain Cook in Marlborough Province in 1773. These were the sole survivors of a small shipment he had brought with him from Cape Colony, but they died soon after being landed. In 1814 the Rev. Samuel Marsden brought over a few Merinos to the Bay of Islands from New South Wales, but there is no record of their permanent survival. It seems that it was not until 1834 that sheep became permanently established in New Zealand, when John Bell Wright brought 102 Merinos from Sydney and landed them on Mana Island, some 20 miles north of Wellington off the west coast of the North Island.

By **J. E. DUNCAN,** ***Wool Supervisor, Livestock Division, Wellington.***

IN the early 1840's sheep stations were established in Canterbury and Wellington Provinces, and soon afterwards in other districts. These first sheep stations were stocked entirely with Merinos, but it was soon found that the wetter climate of parts of the North Island did not suit this breed so well as many districts of the South Island, where they became firmly established in the high country, which has remained their stronghold ever since. During the '50's and '60's of last century a number of English breeds of sheep were imported, notably Southdowns, English and Border Leicesters, Romneys and Lincolns. As time went on other breeds were introduced, but some of these, such as the Cotswolds and Hampshire Downs, did not persist for long. An outstanding event of this period was the evolution of New Zealand's own breed—the Corriedale—which finally emerged as a great new dual-purpose breed towards the end of last century. It traces its ancestry to the crossing of three other breeds—the Merino, the Lincoln, and the English Leicester.

After Refrigeration

Until 1882, the year which marked the successful introduction of refrigeration as far as New Zealand was concerned, the Merino and its crosses were predominant, because the only sheep products of any importance for export were wool and a little tallow obtained by boiling down carcasses. With the advent of refrigeration, however, an entirely new field was opened up, and the British breeds of sheep began to come into their own. Considerable cross-breeding with the Merino took place, and it was not very long before this breed began to decline in numbers and gradually became confined to the higher and poorer country of the South Island, where it has remained ever since.

Before long the Merino, as a purebred, was almost completely ousted from the North Island, its place being usurped by the British long-wool breeds, which were more suited to the climate and conditions. Considerable numbers of Lincolns and English Leicesters were run on the new "bushburn" country (that is, country which had been cleared of forest by felling and burning, leaving many blackened stumps and logs), as their wool stood up well to the rough conditions. These in their turn were gradually displaced by the Romney, and today the flock sheep of the North Island are nearly all crossbreds of the Romney-Lincoln type, with Romney blood very much predominating. The present position will be considered more fully in a later paragraph.

In the South Island the position was more complicated. As the Merinos retreated to the foothills of the Southern Alps it was found that the half-bred (first cross of Merino with a long-wool) and the Corriedale could profitably replace it in much of the better hill country. Lower down again three-quarter-breds (that is, the result of crossing half-bred and long-wool) and the long-woolled British breeds were found to be more profitable. It is significant, however, that in the South Island Merino blood in various degrees of dilution continued to play an important part in the flock structure, whereas in the North Island the Romney has become by far the most important influence.

Of New Zealand's total area of some 66 million acres, almost 43 million are in occupation for primary production. Lines of demarcation between different types of farming are not always very distinct, but approximately 37 million acres are devoted to pastoral production. Of this total, it has been estimated that about five million acres, in round figures, are used for dairy farming, leaving approximately 32 million acres, or nearly half of New Zealand's total land area, for sheep farming. It must be emphasised, also, that much of this land is unsuitable for any other of our present types of farming, so the important role of the sheep in our farming economy is at once obvious. This is further borne out when we compare the value of the products from the sheep-farming industry with those from other industries. In Table I, for the year 1941-42 (the latest complete statistics available), are shown the values of production of a number of items.

It will be seen that the sheep industry again contributes the largest percentage of any of the groups enumerated.

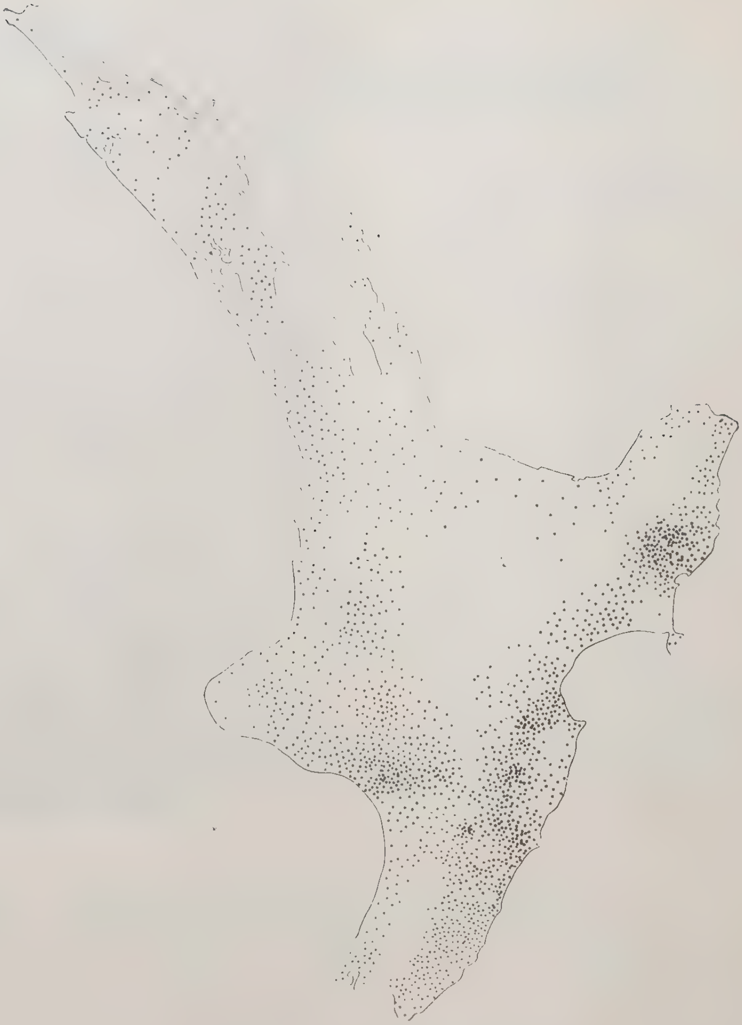
Distribution of Sheep

As will be seen from the maps accompanying this article the density distribution of sheep varies greatly from one part of the country to another. This distribution is governed to a large extent by climate and topography, although other factors have a lesser influence. The sheep is a hardy and adaptable animal, but does not thrive where the rainfall is excessive. It can tolerate a wide range of temperatures, but New Zealand's generally temperate climate is almost the ideal for sheep. Topography has far less of a restricting influence on the sheep than on the dairy cow, and it is only on the steepest and highest ranges that we find no sheep at all. At the other end of the scale, while many breeds of sheep thrive exceedingly on the best pastures, they tend in general to be ousted from this land by dairying, which usually shows a higher rate of net profit per acre.

As would be expected from the great variations in density of the sheep population, the country on which they are run varies greatly in its carrying capacity. At the one extreme we have some of the high country in the South Island covered with sparse native grasses and tussock, which carries about one sheep to 10 acres, while at the other we have improved pastures, heavily topdressed, carrying six or more sheep to the acre. In a similar way the value of sheep farming land varies between perhaps 2s. 6d. and £50 per acre.

The latest detailed figures available (April 30, 1944) show that there are 32,200,298 sheep and 32,973 sheep owners in the Dominion, so that the average size of the flock is very close to 1,000. This figure has been relatively stable since the beginning of the century, but further back flocks tended to be larger.

The reduction in the average size of flock has been brought about to a large extent by the subdivision of many of the large estates which were a typical feature of the pioneering days, and by the inclusion of the small flocks which are often run on dairy



DISTRIBUTION OF SHEEP, NORTH ISLAND: **Each dot represents 5,000 sheep.**

TABLE I—VALUES OF PRODUCTION, 1941-42.

New Zealand Official Year Book, 1943, p. 632.

(In £ millions (N.Z.))

Agricultural	Sheep farming	Dairy farming	Other farming	Mining	Fisheries	Forestry	Factories	Building and Miscellaneous	Total
11.2	42.3	40.0	3.16	5.1	0.6	4.5	41.2	13.4	163.5

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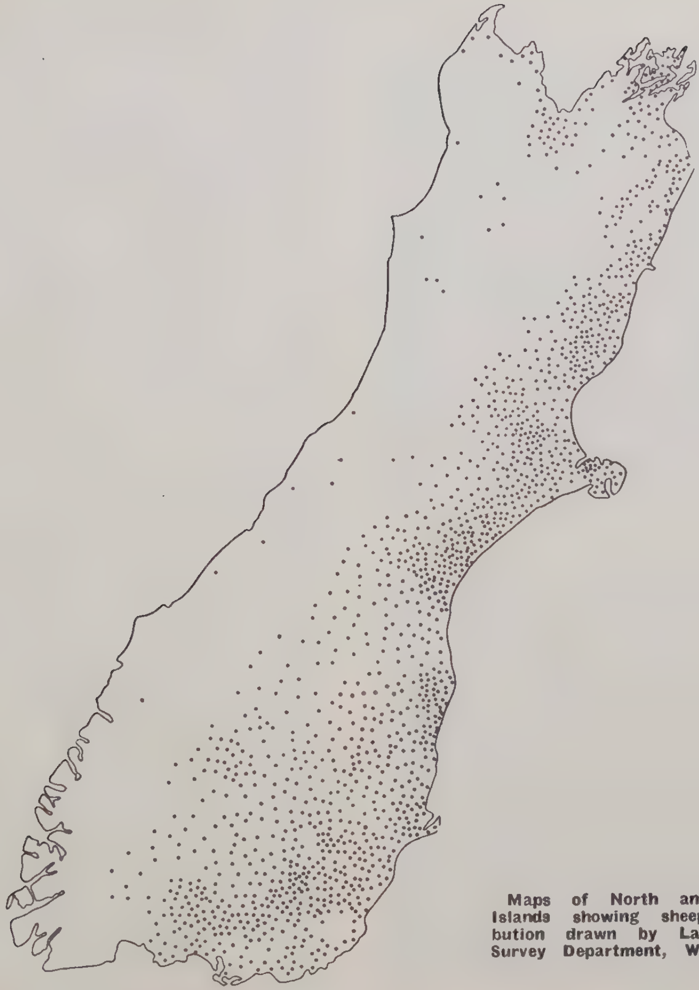

Maps of North and South Islands showing sheep distribution drawn by Lands and Survey Department, Wellington.

DISTRIBUTION OF SHEEP, SOUTH ISLAND: Each dot represents 5,000 sheep.

The salient feature of the above table is the important part played by the Romney in our flocks today, constituting as it does 18 per cent. of our flocks as a recognised breed, and being at the same time the predominating strain in the 70 per cent. of our sheep coming under the crossbred category.

Table 5 completes the picture by giving the proportions of the different classes of sheep.

This table shows that the number and proportion of breeding ewes have been steadily increasing, due in the main to more intensive farming methods, greater use of fertilisers, and better pastures. This is important, because the higher this proportion the more profitable is the flock likely to be, and also because, with a high proportion of breeding ewes, the powers of recuperation or deliberate increase of the flock are enhanced.

SYSTEMS OF SHEEP FARMING.

New Zealand has a great diversity of types of sheep farms, ranging from those which produce wool as practically their sole product to those which are capable of fattening for sale all stock carried. Between these are many intermediate gradations, and as the Dominion covers a fair range of latitude (approximately 1,000 miles from north to south), and as topographical features and efficiency of management also vary considerably, it is possible to find very many in- farms today. Table 2 gives a concise picture of the size of flocks and their distribution.

Certain districts tend to have larger flocks than others. For example, in the Poverty Bay-Hawke's Bay district about 50 per cent. of the flocks are of 1,000 and over, whereas in the Marlborough-Nelson-Westland district only some 14 per cent. of the flocks are of 1,000 and over. Table 3 gives a further comparison of districts.

The sheep included under "other breeds" comprise mostly such types as Cheviot, Suffolk, Dorset Horn, etc., but they are very much in the minority and are of no economic importance at present.

TABLE 2—SIZES OF FLOCKS.

ANNUAL SHEEP RETURNS, 1944.

	Owners of Sheep Owning									Total numbers of	
	1-200.	201-500.	501-1,000	1,001-2,500.	2,501-5,000.	5,001-7,500.	7,501-10,000.	10,001-20,000.	20,001 and over	Owners of Sheep	Sheep.
North Island	3,436	3,502	3,616	4,121	1,298	281	104	89	7	16,454	18,899,656
South Island	3,914	3,970	4,156	3,549	704	136	50	32	8	16,519	14,300,642
Totals—Dominion:	7,350	7,472	7,772	7,670	2,002	417	154	121	15	32,973	33,200,298

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TABLE 3.—COMPARISON OF DISTRICTS.†

† "A. and P. Production"; Department of Agriculture Lambing Estimates; and J. E. Duncan.

District.	No. of Sheep shorn.	Total Area occupied (Acres).	Sheep shorn per 1000 acres.	Estimated Lambing Percentage.	Dairy Cows in Milk per 100 Sheep shorn.	Predominating Breed (s) of Sheep.
North Auckland ..	1,163,054	3,097,253	376	94	81.7	Romney
Auckland	2,788,623	4,708,887	592	91	21.0	"
Gisborne	2,192,336	1,993,995	1,099	83	2.1	"
Hawke's Bay	4,011,783	2,749,169	1,459	86	1.4	"
Taranaki	880,180	1,355,720	649	92	25.8	"
Wellington	6,630,223	5,159,430	1,285	86	3.4	"
Marlborough	1,004,317	2,277,535	441	73	1.3	½-bred & Merino
Nelson	394,196	1,167,820	337	78	7.8	Romney
Westland	74,165	963,077	77	104	16.5	"
Canterbury	4,399,718	8,110,012	543	86	1.4	½-bred & Corriedale
Otago	3,401,415	8,117,044	419	86	1.1	Romney & ½-bred
Southland	2,696,321	3,258,613	827	103	2.2	Romney
Totals, Dominion ..	29,636,331	42,958,555	690	88	5.8	Romney.

TABLE 4.—DISTRIBUTION OF BREEDS, 1944.

Name of Breed.	Stud Sheep entered in Flock Book.	Per cent.	Distinctive breeds but not entered in Flock Book	Per cent.	Total number.	Total percentage.
Merino	19,926	0.06	787,546	2.37	807,472	2.43
Lincoln	3,274	0.01	37,026	0.11	40,300	0.12
Romney	271,827	0.82	5,695,326	17.16	5,967,153	17.97
Border Leicester	12,651	0.04	29,399	0.09	42,050	0.13
English Leicester	13,848	0,04	15,147	0.05	28,995	0.09
Shropshire	769	0.00	3,190	0.01	3,859	0.01
Southdown	155,681	0.47	236,166	0.71	391,847	1.18
Corriedale	43,877	0.13	1,181,613	3.56	1,225,490	3.69
Half-bred	5,904	0.02	2,256,306	6.80	2,262,210	6.82
Ryeland	7,866	0.02	4,531	0.01	12,397	0.04
Other breeds	3,191	0.01	7,892	0.02	11,083	0.03
Crossbreds and others ..	—	—	—	—	22,407,342	67.49
Grand Total	538,814	1.62	10,254,142	30.89	33,200,298	100.00

TABLE 5—SHEEP POPULATION.

Year.	STUD SHEEP.				
	Rams.	Breeding Ewes.	Dry Ewes.	Lambs.	Total Stud Sheep.
1900	7,985	182,255	15,047	123,145	518,377
1905	8,333	192,364	10,866	120,649	552,985
1910	15,068	227,187	13,943	160,234	706,933
1915	16,084	237,717	17,341	176,556	447,698
1920	13,553	154,516	9,803	109,454	287,326
1925	12,400	184,774	7,867	131,485	336,496
1930	14,248	244,480	7,884	174,862	441,474
1935	11,249	231,605	7,292	169,041	419,187
1940	12,273	262,467	5,939	188,556	469,235
1944	13,524	301,283	6,667	217,340	538,814

Year.	OTHER SHEEP.					
	Rams.	Wethers.	Breeding Ewes.	Dry Ewes.	Lambs.	Grand Total Stud and Flock Sheep.
1900	189,945	3,528,799	9,074,799	1,079,524	5,153,696	19,355,195
1905	220,773	2,771,872	9,886,820	698,512	5,220,686	19,130,875
1910	290,501	3,167,082	12,288,193	1,194,570	6,912,842	24,269,620
1915	299,167	3,270,221	12,377,624	1,365,119	7,141,592	24,901,421
1920	293,068	3,901,742	11,569,675	1,824,194	6,317,738	23,919,970
1925	343,179	3,063,663	13,530,479	875,889	6,398,239	24,547,955
1930	434,369	3,367,916	17,319,695	1,069,788	8,208,045	30,841,287
1935	459,821	2,481,354	17,580,812	980,773	7,154,807	29,076,754
1940	528,847	2,434,586	19,465,190	959,611	7,205,406	31,062,875
1944	530,459	2,606,105	20,248,433	1,086,625	8,189,862	33,200,298

dividual differences even between adjacent farms. For the sake of simplicity and brevity it is proposed to make an arbitrary classification into five groups:—

(a) **High hill-country farms.**
(b) **Lower hill-country farms.**
(c) **Fattening farms.**
(d) **Intermediate types.**
(e) **Stud farms.**

(a) High Hill-country Farms

High hill-country farms are mainly to be found in the South Island, where they cover approximately ten million acres, but carry an average of perhaps one sheep to every four acres. This low carrying capacity is due to the steepness and generally low fertility of this type of country, which is in the main a belt running along the eastern slopes of the Southern Alps, and covered principally with native tussock grasses. In this area rabbits and erosion are problems, and heavy snowfalls cause high mortality among the flocks every few years. For the higher sections of this region Merinos are the only sheep which can stand up to the rigorous conditions. A habit peculiar to the breed is to climb to the highest peak and feed systematically down to lower levels. This habit has a distinct value, because it means that the sheep have eaten out these areas by the time they have to be moved to lower country before the heavy snowfalls arrive.

The farmer derives practically all his income from wool, and for this reason pays much attention to the selection of rams and the classing of his clip. He aims to carry as high a proportion of wethers in his flock as possible, these being more hardy and producing a heavier and better fleece than breeding ewes. The latter are kept in just sufficient numbers to breed the necessary flock replacements, and little surplus store stock is available for sale. After a heavy snow loss it may take years to rebuild the flock to its original level, as lambing percentages on this class of country are very low. On some of the easier portions half-bred sheep are run, usually a Lincoln-Merino or a Leicester-Merino cross. In these cases there will be a small number of store stock available for disposal each year, mainly to other high-country runs.

This type of farming is of a highly specialised nature and really lies in a class by itself, bearing very little relationship to any of the other types. The permanent staff employed on a high-country run is small and the handling of the sheep kept to the minimum. In the North Island this type of farming is confined to two small areas, on the high central plateau and on some of the high back-country in the Hawke's Bay-Poverty Bay area.

(b) Lower Hill-country Farms

Lower hill-country farms form a very important section of our sheep farming in both North and South Islands, because of the large aggregate area covered and because they are the source of supply of stock to the low-country fattening farms. It is impossible to give an accurate figure for the area involved, as there is no clear-cut line of demarcation between this group and the fattening farms, but the two groups together probably account for at least 20 million acres. On the hill-country farms climate, topography, and natural fertility again vary widely, but on an average this class of country carries between one and two sheep to the acre.

In the North Island most of this land was originally covered in bush, which was felled and afterwards burnt. Usually many blackened logs and stumps remained for years afterwards, but the initial fertility of the soil, thanks to the liberal coating of ash, was high, and good strikes of surface-sown grass were obtained. From that time onwards a gradual decline in fertility and carrying capacity set in on most of this country, with a good deal of trouble from slips and erosion on the steeper areas. On other portions the encroachment of scrub, fern, and second growth was relatively rapid where this was not rigorously kept in check. It has not been possible to carry out much top-dressing on most of these farms, the steepness of the land and difficulty of access militating against it.

In the North Island the sheep carried are almost invariably crossbreds, with a higher proportion of breeding ewes on the better areas, and more wethers, dry sheep, and cattle on the poorer sections. Cattle are employed as the only practical method for crushing and eating off the roughage, fern, etc., which is left by the sheep and would otherwise increase rapidly. They are really regarded as agricultural implements, and the farmer does not expect to make much profit from them. The favourite types are Aberdeen Angus, Hereford, and crosses between these breeds. They are usually bred on the property.

The stock carried consists of rams, breeding ewes, ewe hoggets (for replacements), and a varying proportion of wethers, according to the class of country. Rams are the only stock bought in, and the farmer pays careful attention to their wool and constitution, both of which influence his returns. The products of this type of farm are wool, some store lambs, and a few fat wethers and store cattle, and last, but not least, an annual draft of cast for-age ewes. These latter are in ready demand on the fattening farms, where they are used for another year or two for mating with

RAMS OF LEADING BREEDS

Purebred Romneys constitute about 18 per cent. of the flock sheep of New Zealand, and are by far the predominating breed in the North Island.

The Corriedale, New Zealand's own breed, is popular as a dual-purpose sheep on the better hill country of the South Island, and sheep of this breed constitute about 4 per cent. of New Zealand's flocks.

Purebred Southdowns comprise about 1.2 per cent. of the Dominion's sheep. Southdown rams are tending to replace Border Leicester as first choice on South Island low country, and in the North Island have for many years predominated as sires in fat lamb farming.

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Down rams for fat lamb production. As the farm is self-supporting for everything but rams, a careful policy of selection and culling of ewes must be followed if the general quality of the stock is to be maintained or improved. The ewes are culled at the two-tooth stage on their wool, and the following season as four-tooths in the light of their breeding performance. In general, little or nothing in the way of supplementary crops for winter feeding is grown on this type of farm.

The corresponding type of property in the South Island differs in a number of ways. In the first place, it was probably developed from native tussock areas instead of standing bush, and in general the rainfall is a good deal lighter than in the North Island. The type of sheep run is usually either half-bred or Corriedale, with a proportion of three-quarter-bred on the lower country. Pastures tend to deteriorate and are of a temporary nature, having to be ploughed up at intervals, a crop taken off, and then resown in grass. This fits in with the necessity for the provision of special crops, such as swedes or turnips, for winter feed, the winters being longer and more severe than in the North Island. Few, if any, cattle are carried, because second growth is not such a problem, but in some areas rabbits are troublesome and have to be constantly kept in check. The general principles of stocking and the disposal of products are similar to those of the North Island properties.

(c) Fattening Farms

The land on which this type of farming is carried out is of high fertility, either natural or induced by topdressing, and may be used either for fattening stock or dairying, according to the fancy of the owner or the net returns from the different products. The country is generally low-lying, varying from flat to undulating. Climate varies from relatively warm and moist in parts of the North Island to fairly cold and dry in the South Island. This influences the type of feed produced, for in the North it is common to rely almost entirely on grass from improved pastures sown in English grasses and clovers and regularly topdressed, while in the South it is essential to grow special crops for fattening. The average range in carrying capacity is from three to six sheep per acre.

Ewes are nearly always bought in and sold again fat after producing lambs for either one, or in some cases two, seasons. In the North Island the cast-for-age (or in some cases younger) ewes from hill-country farms are bought either by private treaty, or more commonly at the annual ewe fairs in January and February. Rams may be acquired by similar methods. Crossbred (predominantly Romney) ewes are almost invariably the rule, and although other crosses with Suffolks, Ryelands, Dorset Horns, etc., have been tried, these ewes are now nearly always mated with a Southdown ram. This results in the most acceptable type of lamb carcass, which reaches finished and well-balanced proportions at an early age and at light weights. Wherever and whenever possible these lambs are milk-fattened, but occasionally a crop such as rape is grown to fatten off the tail end of the lambs. The extra flush of spring grass growth is often controlled by cattle, which are also fattened, and, if of suitable type, can be disposed of in the autumn as chilled beef, the most profitable way to quit them. On some properties wethers may also be bought in and fattened for sale. Lambing percentages are usually high, averaging in the vicinity of 110 to 120 per cent., and lambs are sold on the farm direct to representatives of the freezing companies.

In the South Island conditions in every way are a good deal more varied. In some areas prolonged dry spells make irrigation and the provision of special crops, such as lucerne, necessary. The ewes available from the hill country are also more mixed in type, and may be of Merino, halfbred, Corriedale, crossbred, or three-quarter-bred strains. Any or all of these may be found in certain areas, e.g., parts of Canterbury, where, in addition to the local ewes, large drafts of crossbreds are imported annually from the East Coast of the North Island. The choice of ram also varies. The English Leicester was the first choice, and the sire of the original Canterbury lamb, but today the Southdown is tending to replace it, particularly for crossing with the coarser-woolled ewes, while in Southland the Border Leicester is also popular. Considerable areas of special crops, such as rape, for lamb fattening have to be grown, and roots, hay, chaff, etc., have to be provided for winter feed for the ewes. On some properties wethers and/or cattle may be bought for fattening, but this is not so common in the North Island. In general, lambing percentages are lower and lines of fat lambs produced are not so even or so valuable, pound for pound, as in the North Island.

(d) Intermediate Types

There are various intermediate gradations between the types mentioned previously, and in some cases a large holding may combine hill country and lower fattening land on the one property, the whole being operated as a self-contained unit. Sheep are also to be found on dairy farms, where it is frequently the practice to buy in-lamb ewes, or cull lambs and hoggets, or some of each, to act as followers to the dairy herd. These sheep usually do very well under the conditions obtaining on the typical dairy farm. On other farms, where only a portion of the area is suitable for cows, sheep may provide quite an important contribution to the income. To a small extent in the North Island, and quite frequently in the South, sheep are bought in and fattened on agricultural farms, where they fit into the scheme of things by feeding on such crops as swedes and rape, which are often included in the rotation. There are no recent figures available on the area of these mixed farms, but for the year 1929-30 mixed dairying and sheep farming represented 7 per cent., and mixed agricultural and sheep farming 5 per cent. of the total area of occupied holdings of the Dominion. It is certain that since these figures were compiled the percentage of mixed dairying and sheep farms must have increased, but it is impossible to say by how much. There is not likely to have been any great alteration in the second group.

(e) Stud Farms

Although this group is neither large in area nor in number, it is nevertheless of great importance to the industry, for the stud farm is the fountain head for the supply of rams, and improvements in quality at this point are transmitted over a period through most other flocks. Stud farms are highly specialised, and are nearly always situated on first-class land. One reason is that only with the best environment and nutrition can an animal develop to the full its inherited qualities. This situation is not an unmixed blessing, as many rams have to go straight from these almost pampered conditions to hard hill country.

The stud breeder has several markets for his sheep. In normal times New Zealand does quite a valuable export trade in high-quality stud sheep. Stock have been sent to every major sheep-farming country in the world, and have fetched on an average very satisfactory prices. The top stud masters sell high-quality rams to other stud breeders and a few direct to hill sheep stations. All stud breeders sell flock rams as an important section of their business, although it does not follow that all rams used on the country's flocks are registered studs. In fact, most rams used probably come under the category "sheep of a distinctive breed but not entered in Flock Book"—see table 4. This table also gives the proportion of the different breeds in our stud flocks today. It appears that the most promising avenue for the improvement of our flocks in the future lies in the use of better rams, intelligently used, so the stud stock farms have a great opportunity and a great responsibility.

In Great Britain there are nearly 40 distinctive breeds of sheep which have been evolved, many of them over a long period, to meet particular local conditions. In New Zealand, on the other hand, there are fewer than a dozen breeds which play an important part in our sheep-farming economy (see table 4). It might truthfully be said that in the North Island only two breeds, the Romney and the Southdown, are of major importance, and of these the Romney is distributed over a surprisingly wide range of topographical and climatic conditions. It is not surprising, therefore, that there are today not only a number of distinct types within the breed, but also that the breed as a whole has diverged considerably from its English Romney Marsh prototype. The modern New Zealand Romney is low set, lighter boned, and better fleeced than its English counterpart. In general in New Zealand the British breeds have been deliberately developed along rather different lines from the stud flocks of Britain, the main differences apparent today being that the Dominion's sheep are lower set and have more even and denser fleeces. It is considered by some that in the long run New Zealand might be well advised to employ a greater variety of breeds to suit her widely varying conditions, as Britain has done, rather than to concentrate as at present on virtually a single breed.

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			No. bushels per sack.
Barley ..	50lb.	reckoned to the bushel	4
Beans ..	65lb.	" " " "	3
Bran or Pollard	20lb.	" " " "	7 to 10
Maize ..	56lb.	" " " "	3½
Oats ..	40lb.	" " " "	4
Peas ..	60lb.	" " " "	3½
Ryecorn	54lb.	" " " "	3½
Wheat	60lb.	" " " "	3
Ryegrass	20lb.	" " " "	6

When any of the above grains are ground to a feed meal the bulk is thereby greatly increased and the reckoned bushel weight considerably decreased.

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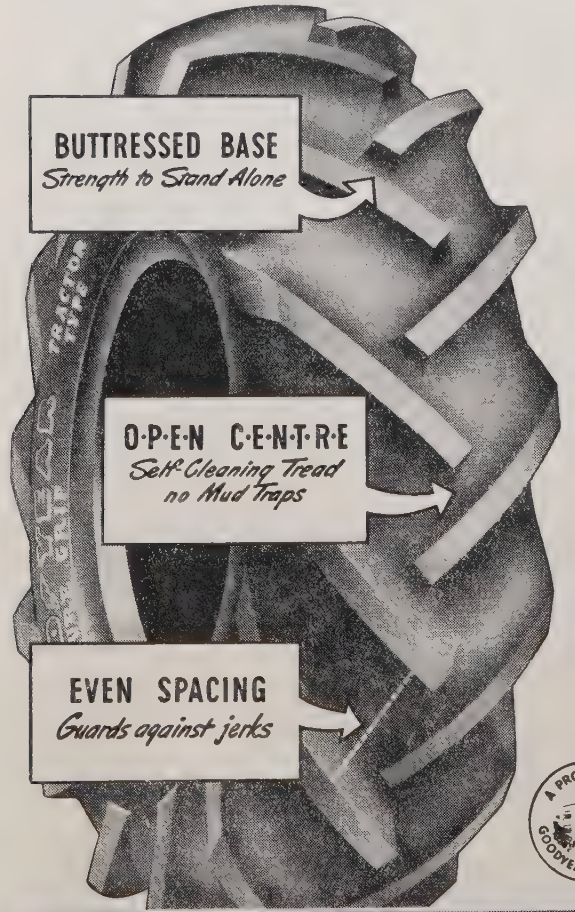
For instance, if the tread design has corners or pockets that can "gum up" with mud, such a tyre is bound to slip and spin—especially in soft or muddy going.



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O·P·E·N C·E·N·T·R·E
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EVEN SPACING
Guards against jerks
TRACTOR TYPE
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On the other hand, a tyre whose tread is *self-cleaning* is bound to dig in and pull better.

So take a look at the tyre pictured here—the great Goodyear Sure-Grip—and you'll see why it lets you get more work from your tractor, in less time and with less fuel.

Those big, husky lug bars are built strong enough to stand alone—without being connected to each other at either end—*no mud pockets.* This gives an O-P-E-N C-E-N-T-R-E, *self-cleaning* tread. Notice, too, that those bars are even-spaced. This lets the Sure-Grip roll smoothly—and *pull* smoothly—without jerking.

We tested Sure-Grips as well as other makes of tyres on our own Goodyear Farms. So we know what we're talking about when we say they're the hardest working tractor tyres on the market today.

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EARTHWORMS

— By —

C. J. HAMBLYN, Fields Superintendent, Palmerston North, and
A. R. DINGWALL, Instructor in Agriculture, Ohakune.

THE maintenance of production and control of soil erosion on hill country in New Zealand have become a major problem during the last 15 years. Officers of the Department of Agriculture have always regarded this part of their work as being of particular importance, and the information now published on the value of casting worms in soil improvement and production on hill country will be of interest to all farmers on this class of land. As stated in the article, the work of establishing colonies in easily accessible localities, which will serve later as sources of supply, is in the preliminary stages only. It will be two or three years before material will be available for distribution.

SOME eighteen to twenty years ago Mr. A. S. Ashmore, who farms a property of 864 acres of hill country in the Raetihi district, Waimarino County, first noticed a green patch of grass in his small farm orchard which was surrounded by the usual dry herbage typical of such an enclosed area. This patch increased in size each year and soon extended out of the orchard on to an adjoining hill paddock, where the affected areas showed earlier growth and a more vigorous, greener sward. A closer investigation revealed that the soil showing the remarkable improvement in growth and colour of the grass was somewhat spongy and moist in contrast to the adjoining firm, dry surface of unaffected areas, and that the pasture had improved from the harsh, dry danthonia and browntop with moss in the bottom to strong, fresh browntop with ryegrass and clover showing up. The soil was found to contain large numbers of a small, light-coloured worm, whose casts covered the surface throughout the winter and spring. An examination of typical hill pastures and soils on the property showed a striking contrast in that the sward was dry danthonia and browntop with much moss and the soil was almost lacking in worms of any type.

Mr. Ashmore was deeply impressed by the changes brought about by the earthworms, and the speed of their spread from the orchard to the next paddock indicated possibilities if they were introduced to other parts of the farm. This he proceeded to do first by collecting the worms and taking them out to other paddocks, where they were placed in the soil, and later by taking out small sods of earth containing worms and placing them on the areas to be "inoculated" with the worms. This work was best done from June to October when the worms were most active. At first no selection of a particular type of worm was made, sods being taken from areas showing numerous worm casts, but observations soon indicated that certain species thrived and multiplied much more rapidly than others and by their large numbers and numerous casts were better fitted to do the kind of work Mr. Ashmore was expecting them to do.

It took about two to three years for the worms to become well established and then from the initial plantings they commenced to work out over the land in all directions, their castings being noticeable from May to October, with most activity in casting from July to September. Except in wet seasons they seemed to disappear completely from late October to early May.

Since 1930 more or less systematic planting of paddocks has been carried out. New plantations in fresh areas were made each year, with the result that by 1945 about 700 acres of the

Casts of earthworms are shown in white square and worms within circles.

property have been planted with worms, whose good work in arresting the deterioration of the pastures and improving the carrying capacity is illustrated in the accompanying table of stock carried during the past 16 years.

It will be noted that the number of breeding ewes has been doubled in the 16 years since systematic plantings of worms began, while the number of cattle and dry sheep has remained fairly constant. The wool clip also reflects the improvement in production achieved, the clip of 10,000lb. in 1930 having been increased to 14,560lb. last season.

While it is not claimed that the activities of earthworms have been entirely responsible for the improved carrying capacity and production from this hill-country farm, Mr. Ashmore, who is an intelligent farmer and a keen student of nature, does give these lowly earth dwellers the major credit. The above in brief is the story of Mr. Ashmore's experience and work with earthworms on his farm at Raetihi, but there is much more to it than this.

Season.	No. of Breeding Ewes.	No. of Dry Sheep.	Total Sheep.	Total Cattle.
1927-28	600	600	1,200	100
1939-40	1,000	450	1,450	125
1943-44	1,200	500	1,750	100

Mr. Ashmore's Property

The property consists of steep sandstone ridges rising from 850ft. up to 1,400ft. overlying papa and mudstone, and is typical of a vast area of rapidly deteriorating hill country in the hinterland of Wanganui, Taranaki, and South Auckland districts. Many blocks of similar country have already been abandoned in these areas. The majority of the bush on the Ashmore farm was felled between 1911 and 1914 and many of the first clearings were regrassed after the widespread Raetihi bush fires of 1918. About 180 acres have been cleared since 1920. The rainfall is about 70in. per annum. The pastures over most of this country rapidly deteriorated to a weak browntop-danthonia turf, with moss and flat weeds prevalent, and a constant battle against invasion by manuka and bracken and other secondary growth, including piri piri and hard fern, has had to be waged, while the production was hardly sufficient to warrant the endeavour to keep the country clean.

Investigation Started

If earthworms can be used to improve the existing pastures and increase the carrying capacity to allow the battle to be carried on in this country, then Mr. Ashmore's pioneer work must have a wide application, and it was in connection with this aspect of the improvements effected by Mr. Ashmore that officers of the Department of Agriculture became interested in the property in 1938.

It was apparent from the start of investigations that one or more special species of earthworms were responsible for the remarkable work being done on this property.

Earthworms of various kinds may be found in almost any hill-country property and yet they are not doing the work that is being done here. Specimens of the particular worm considered by Mr. Ashmore from his observations to be the species which was proving capable of working over steep hill slopes and up sandstone ridges were sent to Sir W. B. Benham, Dunedin, an authority on earthworms, who identified it as *Allolobophora jasseyensis*, a species common in South-eastern Europe but apparently little known in this country. How it got here or on to the property at Raetihi is not known. It may be more widespread than appears to be the case at present. However, the main point appears to be that this particular worm can breed and multiply at a great rate and can find sufficient food for this purpose on typical North Island high-rainfall hill country, and it does not seem to mind whether the pasture is poor and the soil is formed from papa or sandstone or whether it is shallow or deep.

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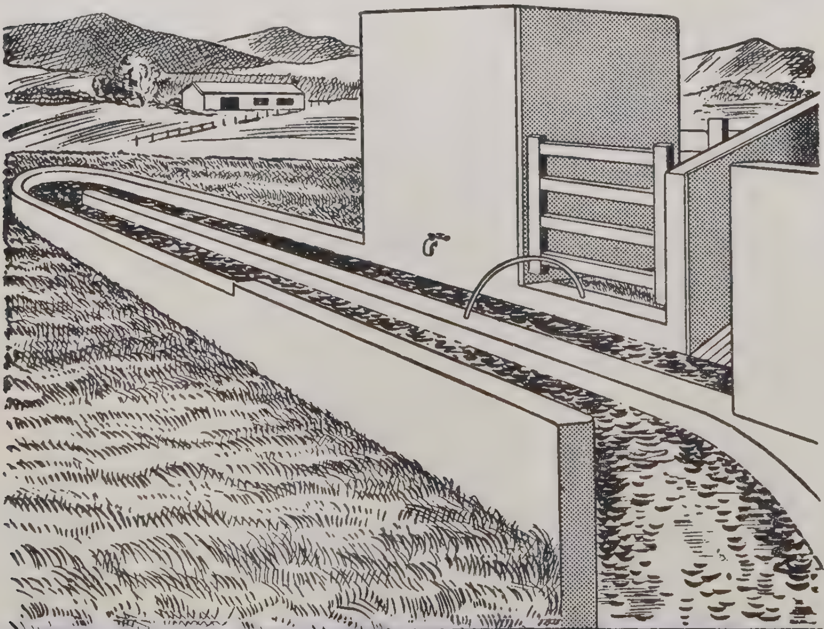
10.3



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Other species do seem to require special conditions, particularly a special and abundant supply of readily available humus or leaf mould, notably those species which frequent rich garden soils, compost heaps, and cowyard manure heaps. Such species are not likely to prove of value on hill country.

With the species identified, a number of sods of earth containing the right kind of worms were obtained from Mr. Ashmore and were sent out both by the Department of Agriculture and the Lands and Native Departments to selected hill-country farms in various districts in the North Island, including the Wairarapa, Manawatu, Dannevirke, Wairoa, Poverty Bay, King Country, and North Auckland, in the years 1940 and 1941 in an endeavour to establish colonies in suitable localities for observation purposes and, if successful, as a source of supply to local hill-country farmers. These early trials have not proved a success, due, it is thought, to the lateness of the season and the possible loss of the worms during transport in open crates.

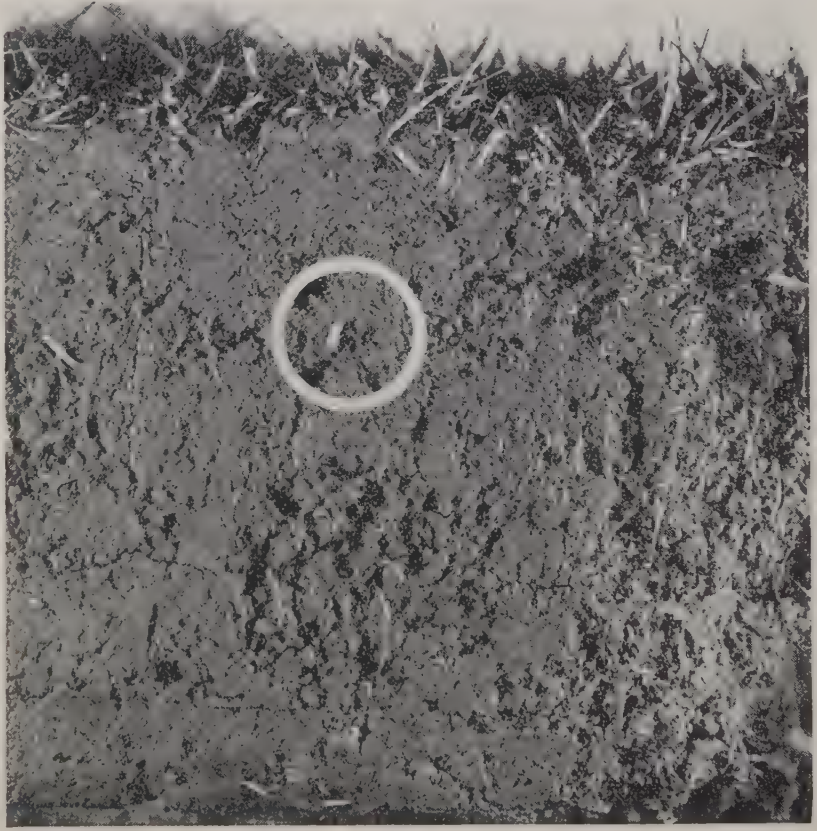
Local Farmers Start Trials

In recent years, however, several farmers in the Wanganui-Raetihi area have obtained specimens, and several successful colonies have been established on hill-country farms, notably that of Mr. R. O. Montgomerie, Kakatahi. These have been followed up by a further distribution by the planting of worms from original colonies on to other areas of the farms. Reports indicate very promising results so far in pasture improvement. In 1941 an official trial was started on Mr. Ashmore's farm on an area not so far invaded by the worms. Plantings were made along a hill slope, single sods containing the special worms being placed in a line about one chain apart for a distance of several chains. When inspected in the spring of 1944 the

TWIN CALVES

TWIN calves are wanted for research purposes at Ruakura Animal Research Station, and farmers who have twin calves which appear to be identical are asked to communicate with the station ('phone 4790, Hamilton). Farmers supplying calf pools may mark any twins they consider identical with a quick-drying enamel or label, and an officer of the station will inspect them at the freezing works for possible selection. Selected calves will be bought at £2 a head and a scale of attractive bonuses is offered for selected calves kept on the farm for periods up to weaning. Details of the scheme and a description of twin calf research at Ruakura will appear in the next issue of the "Journal."

General view of Mr. Ashmore's property.



Side view of pasture sod showing depth of roots (up to 8in.). An earthworm is shown in white circle.

worms had worked both up and down the slope some 1½ to 2 chains from the line of planting, and already several acres were showing the effect of their dense castings in improved colour and vigour of the sward.

Rate of Spread is Impressive

The experience of Mr. Ashmore and of other local farmers as to the practical possibilities of getting a full coverage of large areas of hill country with these worms by systematic planting is confirmed by this trial. It is estimated that from a single planting the worms will work over and cover an acre of land in from four to five years.

Further Trials Planned

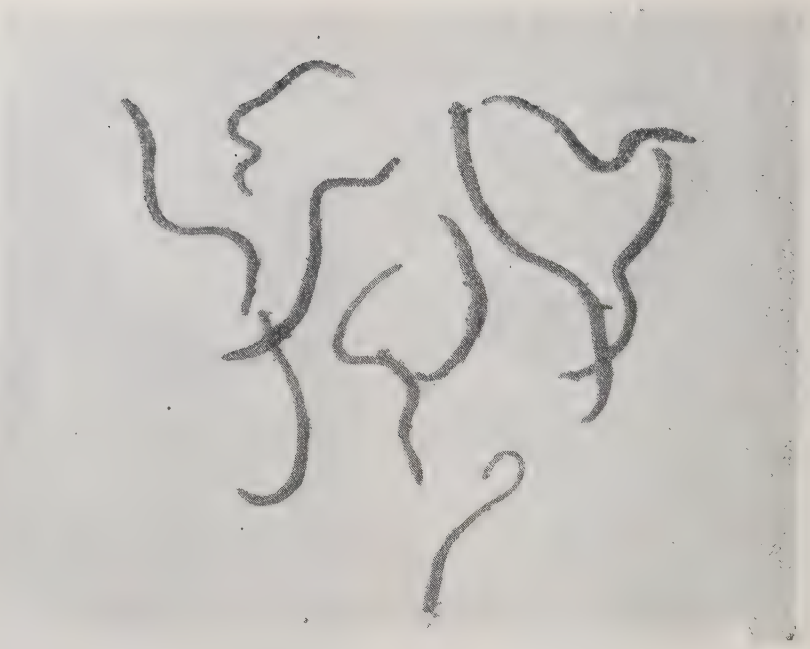
Plans for a continuance of trials in the establishment of the species of earthworm *Allolobophora jasseyensis* by officers of the Department of Agriculture were unfortunately interrupted by urgent war work, but the time has now arrived when these plans can be continued and extended.

Work will be confined for some time to efforts to establish the worms on various types of hill country in as many districts as possible under varying conditions of soil and climate. This work is being organised at present, and it is hoped that most of the main hill-country areas in the North Island will be the subject of trials in the next year or so. It must be remembered that only slow progress can be made, as it takes some two to three years for the worms to become established, but it is expected that successful trials will become not only demonstration areas but also a readily available source of supply of the special type of worm to interested farmers in the district.

From investigations and enquiries in connection with the activities of earthworms, particularly on hill-country farms, it appears that during the past 25 to 30 years earthworms of one sort or another have been observed working over considerable areas of hill country, particularly in the Taihape district, where it is considered by some farmers that a decided improvement in the pastures and production has been brought about by their activities. There was a decided decrease in production due to the usual falling off of vigour of pastures following the loss of fertility resulting from the bush burns, but a definite improvement has taken place since earthworms have worked over the land.

After all, the earthworm was a plougher before the plough was invented, and no-one has yet refuted the statements of Darwin that the 50,000 odd earthworms he found to be the population of a fertile garden soil could lift 10 tons of soil to the surface each year and spread up to 3in. of new soil on the surface in the course of a few years.

Just as we have selected grasses and clovers for hill-country conditions, we may, by the selection of suitable species of earthworm which will thrive under the particular soil and climatic conditions, be able to populate our hill country with these hidden workers, to the great benefit of the soil and future farming of these areas. Mr. Ashmore and fellow-farmers who have made a start in this direction would appear to be on the right road.



Earthworms (half natural size).

The co-operation of Mr. A. S. Ashmore, Raetihi, in making available much of the material for this article and in assisting with the observations and investigation on his farm is appreciated, and the assistance of Sir W. B. Benham, Dunedin, in the identification of earthworm species is acknowledged.

Radio Broadcasts

RADIO talks to farmers will be given from Station 1YA, Auckland, at 7.15 p.m. on the following dates:—

August 6, "Work on the Farm for the Coming Month," by Mr. E. B. Glanville, Acting Fields Superintendent, Fields Division, Department of Agriculture, Auckland, and Mr. P. S. Syme, Instructor in Agriculture, Department of Agriculture, Warkworth.

August 13, talk to be arranged by the Poultry Instructor, Department of Agriculture, Auckland.

August 20, "Animal Husbandry," by Mr. H. R. Denize, Principal Inspector, Livestock Division, Department of Agriculture, Auckland.

August 27, "Young Farmers' Club Session," to be given by Mr. S. Freeman, Organising Secretary, Young Farmers' Clubs' Federation.

Pig Industry Broadcasts

UNDER the auspices of District Pig Councils broadcasts will be delivered in August as follows:—

Auckland—1YA, on August 15, at 7.15 p.m., "Bacon Competitions and their Purpose," by C. Wallace, Supervisor, Waikato District Pig Council.

Dunedin—4YA, on August 13, at 7.15 p.m., "Preparations for Winter Feeding," by H. McDonald, Supervisor, Otago and Southland District Pig Council.

Napier—2YH, on August 9, at 7.15 p.m., "Agricultural Shows—The Showing of Pigs and their Preparation," by I. H. Owtram, Supervisor, Tairawhiti District Pig Council.

Palmerston North—2ZA, on August 21, at 7 p.m., "Crop Subsidy," by L. Marsdon, Supervisor, Wellington District Pig Council.

STUDIES IN FARM MANAGEMENT

A Hakataramea Arable Farm

ARABLE farming, featuring grain and small seed production, in combination with fat lambs and wool, is the main feature of farming in the Hakataramea Valley in South Canterbury. Another striking point in the farming of this district is the high state of mechanisation that has been achieved by many of the farmers.

By

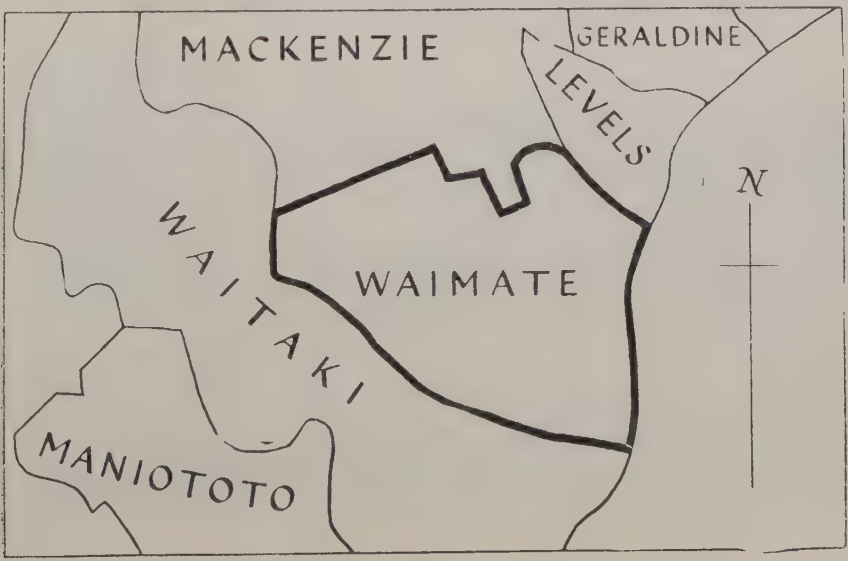
T. A. SELLWOOD,

Instructor in Agriculture, Oamaru.

SOME 60 odd miles from Oamaru lies the Hakataramea Valley, bounded on the north-west by the Kirkliston Range and on the east by the Hakataramea River, while the Waitaki River forms the south-west boundary. Parallel to the Hakataramea River is a range of low-lying hills which are subdivided into several small grazing runs. Although the Hakataramea Valley is included in the Waimate County, considerable business from this locality is transacted in Oamaru and the valley is regarded as part of the North Otago district.

The foothill country is both down land and flat country, while the range country is used principally for the production of wool, although in many cases a considerable number of fat lambs are drafted. The main agricultural farming is confined to the lower areas, which are situated approximately 14 miles from the railhead at Kurow.

The mixed farming practised in this area includes the production of wool, fat lambs, and small seeds, and the growing of wheat. In recent years the farming has become much more intensive, due mainly to the establishment of better pastures, large-scale production of small seeds, and a complete change over to mechanised equipment.



Soils of the Valley

The Hakataramea Valley is just over 30 miles in length and ranges from 2 to more than 8 miles in width. It is bounded on the west by the Kirkliston Range, which rises to just over 6,000ft., and on the west by the Hunters Hills. The valley comprises more than 200 square miles of rolling and terrace country, the general boundaries being shown in the accompanying sketch.

The soils (apart from the alluvial soils formed by the Hakataramea River in recent times, and numbered 1 in the sketch) are related principally to changes in the climate of the valley from one end to the other. At the southern end the climate is dry (17.5in. of rainfall annually), and there has been little leaching of plant foods from the soil. The soils here fall into a group termed the Omarama series of soils, which, in spite of drying out rapidly in summer, are well supplied with plant foods. Nearer the head of the valley the climate becomes damper and rather colder (owing to increase in altitude) and the Omarama soils give place to a group of soils termed the Kaikoura series, which are rather more strongly leached. These soils are poorly supplied with plant foods, and require dressings with lime, and probably other artificial fertilisers as well. Where the soils are moderately steep, i.e., just beyond the limit of ploughability, the letter "a" is added to the number. Where the soils are steep "b" is added to the number.

Climate

The climate of the Hakataramea Valley is one of extremes of heat and cold. During the spring and summer the weather conditions are usually

VIEWS OF THE DISTRICT

very good, but during the winter it is extremely cold; very hard frosts are experienced and at times heavy falls of snow cover the entire valley.

Rainfall

The following rainfall figures for the period 1936-43 are recordings on one particular farm. It is the general practice in this valley for the farmers to record their rainfall.

Year.	Inches. Rainfall.
1936	25.10
1937	25.58
1938	32.71
1939	18.76
1940	25.68
1941	18.92
1942	23.47
1943	32.61

Average rainfall for 8 years: 24.94in.

The rainfall on the foothill farms is at times considerably heavier than that on farms further out.

Annual Crops

The annual crops grown are as follows:—

1. Cereal crops: wheat mainly for threshing; oats for chaff and threshing; oats for greenfeed.
2. Brassica crops for supplementary feeding: rape and turnips.
3. Grass seed crops.
4. Lucerne for haying.

GRAIN AND PULSE CROPS,
Waimate County (Acres).

Crop.	Season. 1938-39.	1940-41.	1941-42.
Wheat	11,304	18,311	19,349
Oats—Threshing ..	3,599	5,857	6,453
Chaff ..	9,682	10,657	9,644
Greenfeed ..	1,482	2,175	1,660
Barley—Threshing ..	582	1,124	1,275
Feed ..	81	757	349
Peas	301	533	737
	26,831	39,414	39,467

Increase wheat 1940-41 .. 7,007 acres.
" " 1941-42 .. 1,038 "

The marked increase in 1940-41 is due mainly to the response to the call for increased production, particularly of wheat, as a war measure.

GREEN, ROOT AND OTHER CROPS,
Waimate County (Acres).

Crop.	Season. 1938-39.	1940-41.	1941-42.
Turnips and rape ..	1,061	2,343	472
Chou moellier & rape	13,623	14,900	17,320
Turnips	17 688	12,288	5,330
Mangolds	377	706	717
Potatoes	1,879	1,668	1,505
	34,658	30,005	24,344

The increases in rape and mangold crops and the decreases in turnips and potatoes are significant.

GRASSES AND CLOVERS,
Waimate County (Acres).

Crop.	Season. 1938-39.	1940-41.	1941-42.
Grasses and clovers cut for seed—			
Perennial ryegrass	1,990	4,148	5,118
Red clover ..	1,309	2 006	3,580
White clover ..	491	643	1,481
Grasses and clover cut for hay ..	4,406	1,507	1,736
Grasses and clovers sown since Jan. 31 .	20,683	20,627	22,675

Note the marked increase in the production of small seeds and the increase of some 2,000 acres in the area sown to grass in 1941-42.

A HAKATARAMEA ARABLE FARM

A description of general practice on the farm of Mr. George Grant, jun., is typical of farming operations in the valley. On this farm, however, as on most good farms, one sees outstanding features, such as the situation of the farm, well-planned shelter belts, plentiful water supply, and good gates and fences. These features all lend themselves to the best development of a farm, and, coupled with the foresight and judgment of the farmer himself, greatly assist in the building up of a high standard of efficiency.

The total area of the farm is 702 acres. It lies at a height of 1,200ft. above sea level. The soil type of this typical farm is a good loam and is representative of the class of soil found on the foothill farms. There is an area of 55 acres of rough grazing land, but a considerable portion of the latter is now occupied by good shelter belts. The remainder of the area is in the following crops:—

PLAN OF FARM SHOWING CROPS AS AT JANUARY, 1944.

Field No.	Area. ac.	Type of Crop.
1	43	Pasture, Stock ryegrass 1 bus.; pedigree white clover 1½lb.
2	40	Pasture, Mother ryegrass 1 bus.; Mother Montgomery red clover 3½lb.
3	37	Pasture, Mother Montgomery red clover 3½lb.; perennial ryegrass 1 bus.
4	52	Pasture, Mother Montgomery red clover 4½lb.; Mother ryegrass 11lb.
5	50	Fallow for wheat.
6	20	Wheat 1943-44.
7	54	Pasture, Pedigree perennial ryegrass 1 bus.; white clover 1lb; Montgomery red clover 2lb., and broad red clover 1lb.
8	26	Wheat 1943-44.
9	37	Pasture, Pedigree perennial ryegrass 1 bus.; white clover 1lb.; Montgomery red clover 2lb.; broad red clover 1lb.
10	30	Bare fallow.
11	29	Rape Broad Leaf Essex 1½lb.; Pedigree Montgomery red clover 3½lb.; Mother Seed ryegrass 10lb.
12	51	Imperial Green Globe turnip 9½oz.; Montgomery red clover 3½lb.; Mother Seed ryegrass 10lb.
13	40	Pedigree ryegrass 1 bus.; Pedigree white clover 1½lb.
14	13	Wheat 1943-44.
15	20	Wheat 1943-44.
16	20	Greenfeed, black barley 2 bus. 1943-44; and fallowed for wheat.
17	30	Pasture, Pedigree perennial ryegrass 1 bus.; Pedigree white clover 2lb.
18	25	Pasture, Pedigree perennial ryegrass 5lb.; broad red clover 3lb.; sown with wheat 1942-43 for green manuring.
19	5	Fallow for lucerne.
20	20	Lucerne, 15lb. per acre, seed inoculated.
21	6	Pasture, Mother Seed ryegrass 1 bus.; Montgomery red clover 2lb.; white clover 1lb.
22	6	Pasture, Mother Seed ryegrass 1 bus.; Montgomery red clover 2lb.; white clover 1lb.
23	5	Native grasses.
24	3	Fallowed for lucerne.
25	2	Holding paddock.

P1
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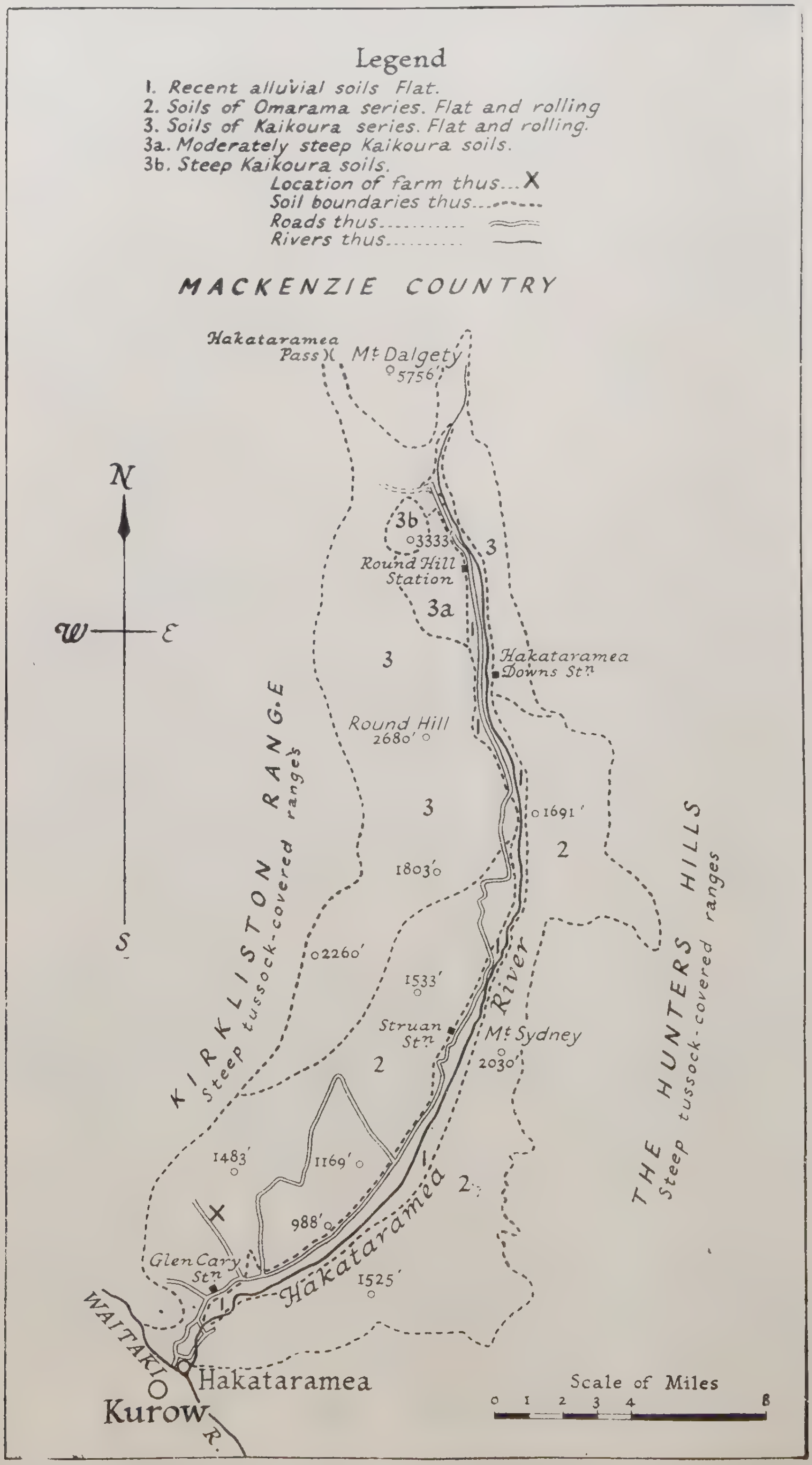
The Railways Can Take It

Rotation

The rotation is a seven-year one. The pasture is broken up in the late spring, cultivated, and summer fallowed for wheat. The wheat crop is followed either by rape, turnips, or barley. The land is then ploughed and prepared for the sowing down of the pasture, which is down for four years, after which it is ploughed again for wheat. A typical rotation would be as follows:—

Pasture ploughed September-October, 1940.

Wheat sown March-April, 1941.
Wheat ploughed March, 1942.
Turnips sown December, 1942.
Turnips fed off May, 1943.
Grass sown October-November, 1943.
Grass ploughed October, 1947.


Legend
1. Recent alluvial soils Flat.
2. Soils of Omarama series. Flat and rolling
3. Soils of Kaikoura series. Flat and rolling.
3a. Moderately steep Kaikoura soils.
3b. Steep Kaikoura soils.
Location of farm thus... X
Soil boundaries thus
Roads thus
Rivers thus
MACKENZIE COUNTRY
Hakataramea Pass
Mt Dalgety 5756'
N
W
E
S
3b
3333
3
Round Hill Station
3a
3
Hakataramea Downs Stn
Round Hill 2680'
KIRKLISTON RANGE
Steep tussock-covered ranges
3
1691'
2
1803'
2260'
1533'
Struan Stn
Mt Sydney 2030'
River
2
THE HUNTERS HILLS
Steep tussock-covered ranges
1483'
1169'
2
X
988'
Glen Cary Stn
1
Hakataramea
1525'
WAITAKI R.
Hakataramea
Kurow
Scale of Miles
0 1 2 3 4 8

Wheat

The variety Cross 7 has entirely replaced the old Hakataramea Velvet. As a heading wheat it has no equal, and consequently in districts where header harvesters are operated it is highly favoured. All seed is treated with a mercurial dust previous to the sowing season, which is in April or early May. The seeding is 1½ bushels per acre and superphosphate is sown at 1cwt. per acre.

Yields of wheat average approximately 45 to 50 bushels, but in some seasons, when grown on the heavy land near the foothills, the yield ranges from 50 to 70 bushels per acre.

Rape

Rape, used for lamb fattening, is sown by the ridger or drill. When the ridger is used rape is sown in 26in. drills and the seeding is 1½lb. per acre, but when drilled it is sown through every coulter in 7in. drills at 4lb. per acre. The ridger is used when conditions are satisfactory and favourable, as this practice, together with cultivation, usually gives a more satisfactory crop. When climatic conditions show a tendency for a dry spell drilling is done on the flat. Fertiliser is used at the rate of 1½cwt. superphosphate per acre, all sown through the front box in the case of the ridger, or, if drilled, 1cwt. is sown through every coulter with the seed.

The rape crop (Broad Leaf Essex) is sown in November, and is fed off in breaks during January and February. It has proved a very satisfactory crop, and the fact that the average weight of lambs produced is 40lb. is sufficient evidence of the value of this crop for fattening lambs.

Barley

The barley crop is always spring sown, the variety mainly used being Chevalier and the seeding 1¾ bus. per acre. This crop is not fed off, and when harvested it is windrowed and picked up by the header harvester. The average yield of barley is 60 bushels per acre.

Turnips

Turnips are sown in early December, the variety mainly used being Imperial Green Globe. Good crops are usually grown, and they provide good supplementary feeding for the winter period, when the crop is fed off in breaks. The seeding is 9½oz. per acre, and superphosphate is used at 1cwt. per acre.

Implements

The farm is highly mechanised, the implements being as follows:—

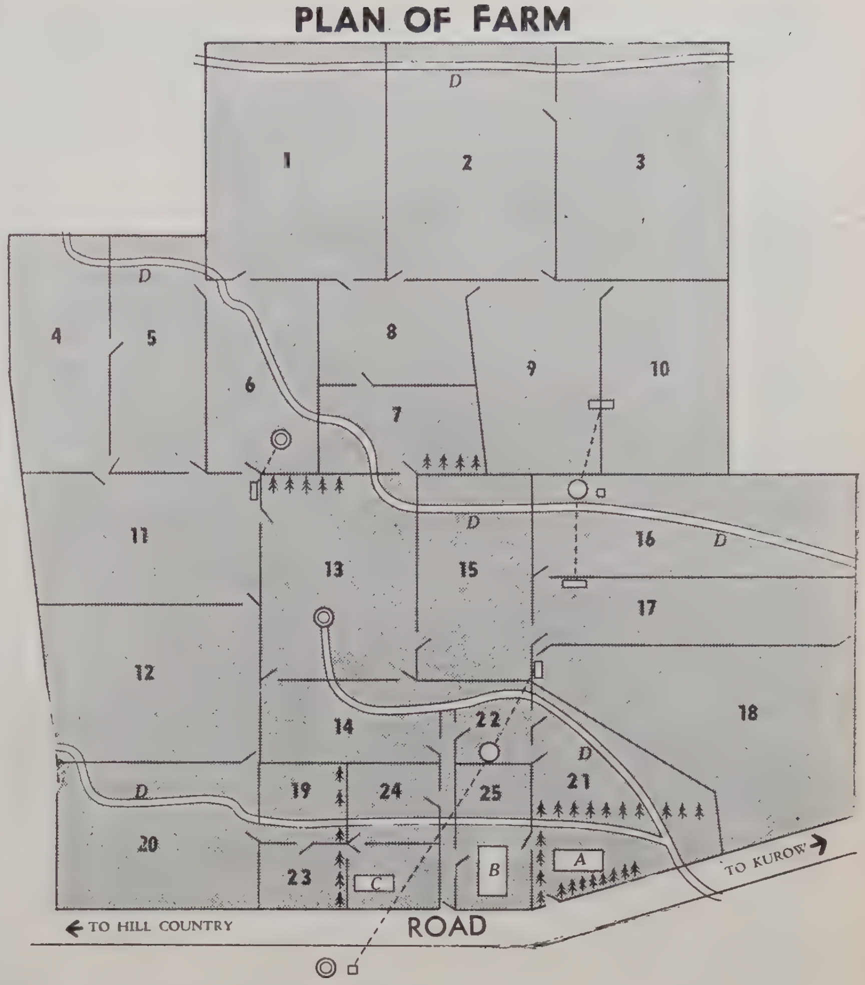
- 2 tractors (41 and 28 h.p.).
- 2 headers.
- 1 5-furrow plough, used principally for ploughing wheat stubble and green crops.
- 1 4-furrow and 1 2-furrow plough.
- 1 3-furrow plough.
- 1 set tandem discs.
- 1 9ft. Cambridge roller.
- 1 15-coulter grain drill.
- 1 set 24ft. harrows.
- 1 18 h.p. pickup baler, which can press up to 900 bales per day.

As a considerable amount of capital outlay is involved in purchasing mechanised farming equipment, it is very necessary that the machinery concerned should be well cared for and well housed. Many thousands of pounds' worth of farming machinery shows rapid deterioration through lack of care and attention. Particularly is this the case with machinery that is poorly housed, or in many cases left out during the winter under all weather conditions. Mr. Grant has this important point well in mind. All equipment when not in use is housed in an implement shed which gives a storage space of 6,000 square feet. A modern, well-equipped workshop allows a considerable amount of repair work to be carried out on the farm, saving much valuable time and allowing immediate attention to be given to breakages. This is most important, particularly during the harvesting period.

Cultivation

The initial break-up of pasture is done by skim ploughing to a depth of 3 or 4in., and the turf is allowed to lie for 6 weeks, after which a system of dry soil cultivation is carried out by discs, grubbers, and harrows, mainly the two last-named. After this the land for wheat is deep ploughed in the early autumn to a depth of 6 or 7in. For preparation of land for a spring-sown crop the disc harrows and tine harrows are used to mulch the soil for moisture conservation until such time as the crop is to be sown.

Sheep and Wool



The total number of sheep carried on this farm all the year round is 939, made up as follows:—Breeding ewes 675 (Romney-Corriedale cross); rams 14 (9 Southdown and 5 Corriedale); ewe hoggets 250. The average lambing percentage is 100. Fat lambs drafted to the works average 700 annually. The wool clip totals 24 bales, the average weight of fleece per sheep being 10lb.

Flock Management

The rams go out in the middle of April, and lambing operations commence in the middle of September. Lambs are weaned towards the end of January. One third go off as fats from the mothers, while the remainder are finished off on the rape.

The practice on this farm is to keep 250 ewe lambs for breeding purposes. This season, however, only 50 were retained, and 200 were bought in as replacements. The ewe lambs are obtained off the high country.

LEGEND

▭ Trough

○ Tank

◎ Spring

□ Pump

↟ Shelter trees

A. Homestead. B. Implement shed.
C. Cottage. D. Creeks.

Pastures

When grass is to be established the field is first deep ploughed and is then left to the action of the winter weather. In the spring, as soon as weather conditions are favourable and the land is workable, if lime has not previously been applied during the rotation, it is applied at the rate of 1 ton per acre. The soil is then disced with the disc harrows and given a light grubbing. Harrowing is then carried out periodically so that surface weeds will be kept down. The best sowing period is from November to January. The land is rolled previous to sowing, and the seed sown in 7in. drills; the final operation is to harrow the field with a set of light harrows. Superphosphate is sown

VIEWS OF THE FARM

Ploughing

Baling hay

The homestead

Header harvester

Flock ewes

with the crop at 1cwt. per acre, and grass is usually topdressed with superphosphate at 1cwt. per acre.

The general practice for pasture control is to concentrate the stock on the pasture. In seasons of very flush growth when control by stock is insufficient the power mower is used for topping the pastures.

After the wheat is harvested one ton of carbonate of lime is usually applied to the fallowed land during the spring.

Haying Crops

Lucerne is the main hay supply, as this crop gives an excellent result and is permanent. It is generally sown at 15lb. per acre in November or December. The three cuts per year supply approximately 2,000 bales of hay. The average weight per bale is 70lb., the 2,000 bales harvested giving a total weight of 62 tons of hay for 20 acres. At £5 per ton this returns £310.

Small Seed Production

Small seed production is a prominent feature of the farming operations on this typical farm, the small seed crops being certified perennial ryegrass, certified white clover, and certified Montgomery red clover.

Pastures sown down for seeding and grazing are sown with a mixture of **1½ bus. ryegrass, and 2lb. of white clover.** Sowing is carried out during November or December. Fields kept for seed production are closed during September or early October.

Montgomery clover fields are sown down with a mixture of 3 to 4lb. of clover and ½ bus. of perennial ryegrass. Montgomery clover areas for seed production are grazed until late November, and are usually heavily stocked previous to closing up to ensure a uniform growth of clover.

The average area set aside for small seed production is 283 acres. All harvesting operations are carried out by header harvester. Ryegrass and white clover crops are first cut by a power mower into windrows, and the crop is finally picked up from the windrow by the header. Montgomery red clover crops are headed direct. Cocksfoot is either windrowed or sheaved, and is, therefore, either picked up or threshed out of the stook by the heading machine.

Cocksfoot

No cocksfoot is used on this farm, because ryegrass and white and Montgomery red clover pastures give highly satisfactory results, both from the point of view of grazing and seeding.

Cocksfoot, however, does well in the valley, and quite a considerable area is harvested at times. In the main this is the only seed crop which Mr. Grant does not grow. His farming operations are similar to those of the other foothills farms in every other respect.

Dressed Seed Yields

From 1936 to 1944 the following yields of ryegrass and Montgomery red clover were obtained:—

		Ryegrass.			Montgomery Red Clover.
1936-37	..	238	bus.		4,400lb.
1939-40	..	86	"	7lb.	5,856lb.
1940-41	..	1,249	"	12lb.	8,623lb.
1941-42	..	180	"		6,047lb.
1942-43	..	275	"	10lb.	7,718lb.
1943-44	..	850	"	10lb.	100lb.
		2,879	bus.	19lb.	32,744lb.

This gives an average of 479 bus. over a six-year period. Over the same period 32,744lb. of Montgomery red clover seed was also produced, an average of 5,457lb. over the six-year period. These yields include good and bad seasons.

Conclusion

It will be seen that the seven-year rotation of this typical farm is very satisfactory, lending itself to the production of wheat, wool, fat lambs, the grazing of supplementary feed crops such as rape and turnips, and the production of small seeds. The lucerne gives a satisfactory hay supply and renewal of the stand is not necessary for several years at least.

Acknowledgments

Thanks are expressed to the Soil Survey Division of the Department of Scientific and Industrial Research for data in the soil map and to the Lands and Survey Department for the drawing of maps.

SOIL EROSION AND HIGH COUNTRY DETERIORATION

THE menace of soil erosion in New Zealand and the possibilities of recovery as indicated by the response to spelling, surface sowing, rabbit control, and the elimination of burning are the subject of a booklet just published by the Soil Conservation and Rivers Control Council, "Tackling High Country 'Problem Land' at Molesworth" (Bulletin No. 2). This timely study of an abandoned property ruined largely as a result of short-sighted farming practices is well illustrated and evidences a serious and determined approach to a problem of vital importance to New Zealand's agricultural and pastoral future. Copies are obtainable from the Soil Conservation and Rivers Control Council, Wellington.

The weight of a cubic foot of roots in a clamp or pit is as follows:—Turnips, 33lb.; swedes, 34lb.; mangolds, 35lb.; carrots, 31lb.; parsnips, 31lb.; potatoes, 42lb.

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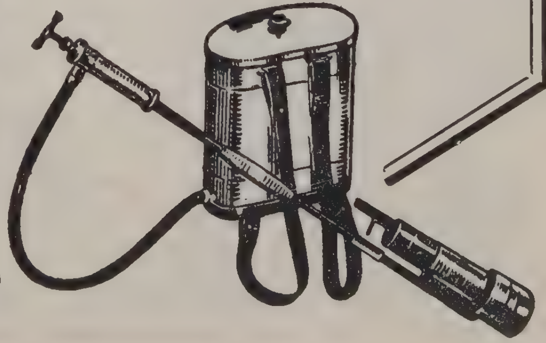
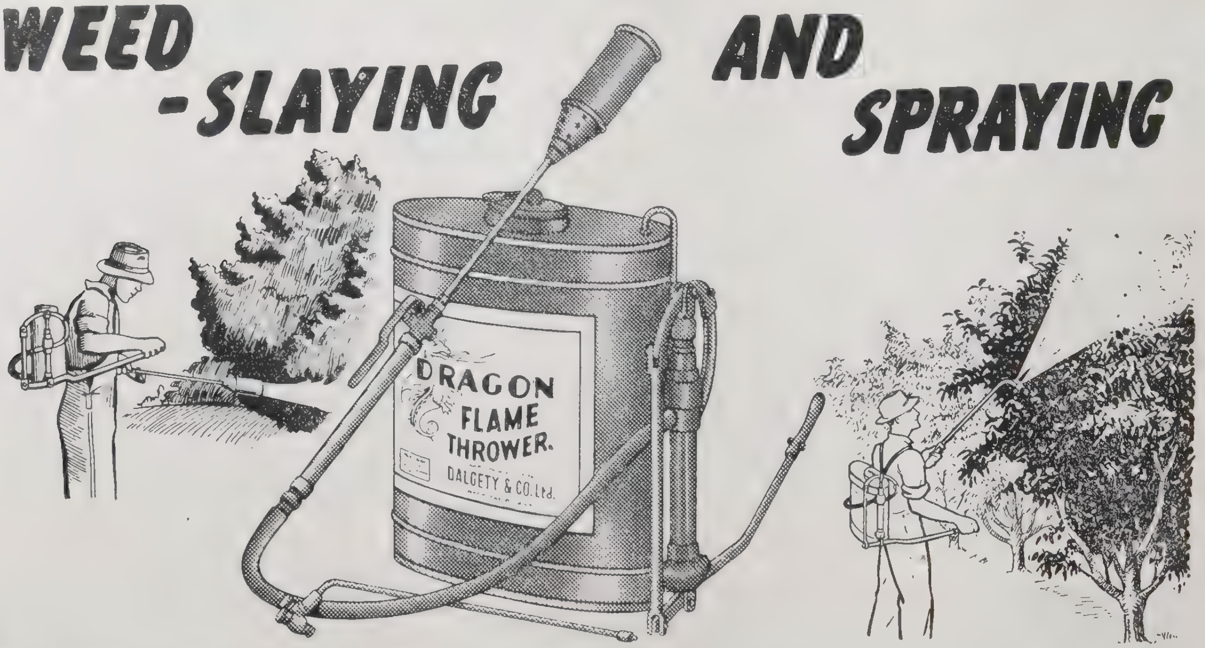


WEED -SLAYING AND SPRAYING



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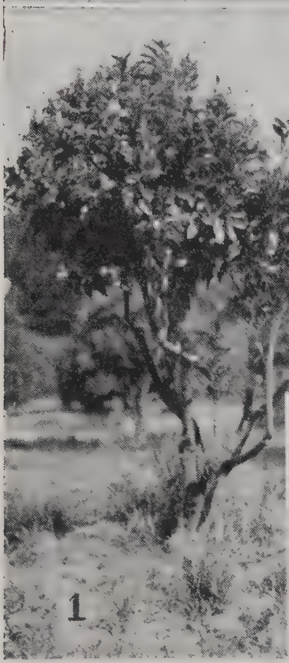
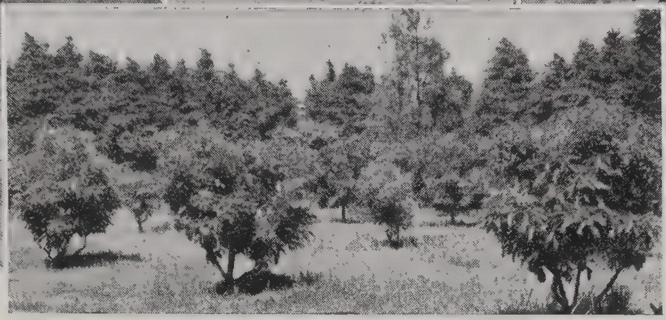
9. **Dual Purpose.** The "Dragon" can be quickly converted into a sprayer for use with creosote and insecticides.
10. **Built to last** for years of Good Service.

Reworking of Citrus Trees

By
A. M. W. GREIG,
Citriculturist,
Wellington.





New Zealand grapefruit trees budded about 2 years previously on to Duncan grapefruit when the latter trees were 4 years old.

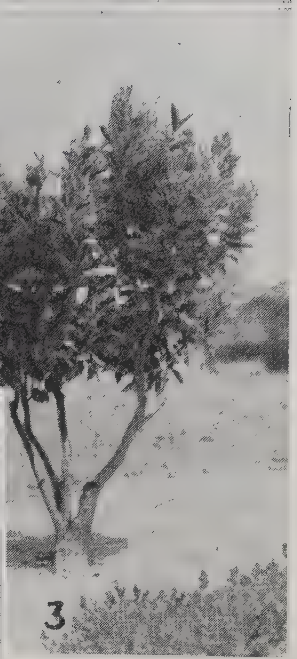
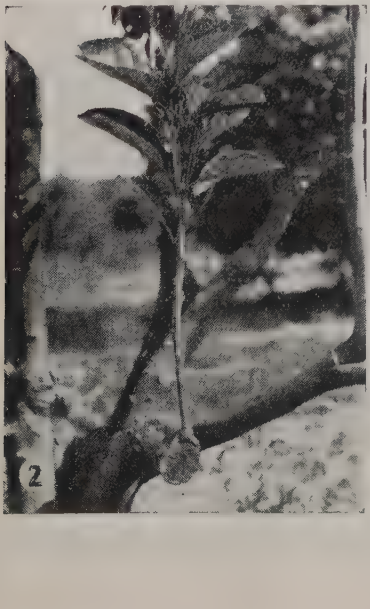


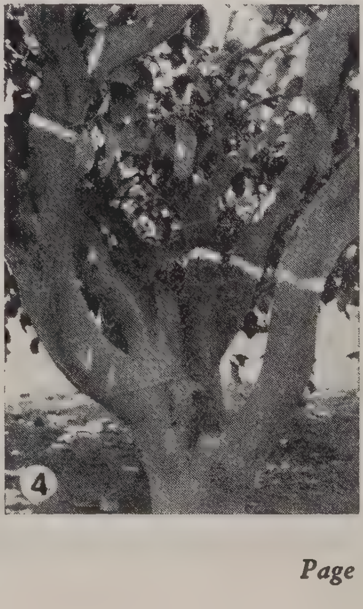
Fig. 1.—A New Zealand grapefruit tree budded on to a sweet orange tree when 9 years old. The limbs on the left are 3 years from the bud; those on the right are 2 years from budding. The shield method of budding was employed in February and buds inserted into the limbs 2 to 3ft. from ground level. Fig. 2.—The type of growth into which the bud was inserted. Fig. 3.—A Washington navel sweet orange tree 2½ years after being budded on to a Lue Gim Gong orange, which was then 4 years of age. Fig. 4.—A Genoa lemon grafted on to a sweet orange tree about 7 years previously, when the sweet orange tree was about 10 years old. The graft unions can be seen above the white lines on the tree trunks. This grafting was done in the spring, only half of the tree being headed back and crown grafts inserted. The following season the balance of the tree was treated in a similar manner.

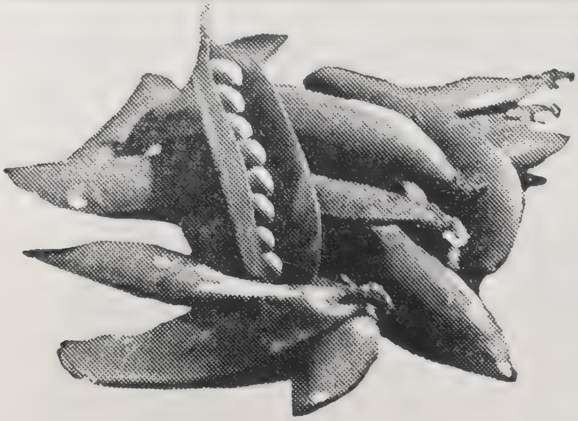


SUCCESS in reworking citrus trees depends upon the choice of bud or grafting wood, the time and thoroughness of operations, the vigour of the tree being reworked, and the affinity of buds or grafts to the tree being treated.

Successful reworking of citrus trees has been carried out by growers in the Tauranga district, and the accompanying photographs illustrate practices employed.

[Photographs by I. L. Nottage.





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CANTERBURY: Alex. McDonald & Co., Cashel Street, Christchurch. Telegrams: "Quality."

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National Pig Industry Council

Year's Activities Reviewed

INVESTIGATIONS into the certification of farm seeds, chopper prices, and their end products, the establishment of whey piggeries in Taranaki, meat-meal supplies, a Stock Food Bill, preservation of curd, and the re-organisation of the National Pig Industry Council and District Pig Councils were among the activities of the National Pig Industry Council during the past year, said Mr. E. J. Fawcett, chairman, at the annual meeting of the council in Wellington recently. The executive had met five times, and a special committee advisory to the Department of Agriculture with reference to the crop subsidy scheme gave valuable assistance.

"SLAUGHTERING figures show that production of pigs has fallen considerably over the past three years," said Mr. Fawcett. "No efforts have been spared to encourage production. Progressive increases in the schedule have been made over the last two years, and representation to the Hon. Minister of Agriculture by the executive has been instrumental in obtaining further increases in the price, one in May and one again in November."

The weight range for baconers had been raised to 200lb., and imported stock feeds had been subsidised to keep prices to pig-producers at an economic level. Because of the shortage of stock feeds from overseas, the crop subsidy scheme was introduced. Nevertheless, in spite of these advantages, pig killings continue to fall. The position for the four years, ended March, was as follows:—

Slaughterings for:—

Year.	No. of Sows.	Total Kill.	Bacon.	Pork.	Choppers.
1941	100,400	986,985	505,478	433,068	48,439
1942	91,300	1,002,211	414,017	553,818	34,376
1943	82,000	839,882	410,561	392,996	36,325
1944	77,300	726,282	421,947	281,153	23,182
1945	80,000	678,834	481,195	177,859	19,780

"The most noticeable aspect of last season's production, apart from the decrease of over 47,000 in the number of pigs slaughtered, is the phenomenal increase in the baconers killed, which exceeds the previous season by more than 59,000, and has resulted in raising the weight of pig-meats produced by nearly 500 tons," the chairman continued.

This increase in bacon production was not peculiar to the past season, but had been happening over the past three years, and indicated the producer's desire to meet the demand for the particular class of pig-meat most suitable for present-day trade requirements. It was not surprising, therefore, that pig numbers were down, for it must be obvious that in the effort to meet the market for baconers it was not possible to carry the same number of pigs. "Nevertheless, we must not lose sight of the fact that the target for the season ending September, 1946, is 50,000 tons, which means a considerable increase on the past season's production of 41,900 tons.

"The position for September, 1945, cannot be viewed as encouraging. For the six months ended March, 1945, killings by comparison with the same period last year are down by 62,000 carcasses. With the approach of winter and the corresponding reduction in killings, it is unlikely that production will reach the September, 1944, figure. While the production of baconers has again increased over this period by 15,200 carcasses, tonnage of pig-meats cannot be increased or even maintained unless the slaughtering of baconers is still further encouraged over the next six months. The forecast for the year ending September, 1945, is 700,000 carcasses, as against 741,000 in 1944."

Due to the encouragement given through the crop subsidy scheme, the effects of which cannot be shown until 1946, an improvement in production was to be expected by March next. District Pig Councils were to be congratulated on the efficient manner in which they had handled the administration of the scheme, which had run very smoothly, due to the efficient set-up in the beginning. As the position of imported grain feeds was still in some doubt, the continuance of the crop subsidy scheme was still the only solution to increased production of pig-meats, and War Cabinet had approved the continuance of a subsidy on crops for 1946. The conditions were to be on the same basis as had been in operation for 1944-45. The scheme would again be administered by District Pig Councils.

That many producers were quick to grasp the advantages was evident by the fact that 5,250 farmers had made claims under the scheme, involving some 23,000 acres of mixed crops. Approximately one-third of this area was in respect to grain crops —barley, maize, and peas—representing 9,000 to 10,000 tons of high-quality feed, which was half the total grain imported for pig production in the previous season. With winter feed supplies assured, there should be no difficulty in reaching the target of 50,000 tons of pig-meats for the season ending September, 1946.

"Pig-producers should have confidence, and expand," said Mr. Fawcett. "Expansion does not necessarily mean an increase in breeding stock, although this would be desirable. An improvement in the number of pigs slaughtered per sow from 8.8 to 10.5, a figure which was reached in 1941, would improve slaughterings by more than 150,000 pigs. With a continuance of the trend for bacon production there should be no difficulty in reaching our target."

Among other important matters dealt with by the executive was the embargo on the export of liver-meal. A deputation comprising members of the executive and representatives of the Poultry and Dairy Boards waited on the Hon. Minister of Agriculture to discuss this and the introduction of a Stock Food Bill. The Minister gave full support to the action taken by the Primary Industries Controller regarding the embargo on liver-meal, but felt that, with the present short-

WEIGHT OF PIG-MEATS PRODUCED.

	1941.		1942.		1943.		1944.		1945.	
	Average Weight.	Pig-meat.	Average Weight.	Pig-meat.	Average Weight.	Pig-meat.	Average Weight.	Pig-meat.	Average Weight.	Pig-meat.
	lb.	tons.	lb.	tons.	lb.	tons.	lb.	tons.	lb.	tons.
Pork	80	15,500	83	19,000	85	15,000	88	11,043	89	7,064
Bacon	140	31,580	141	25,000	144	25.000	147	27,642	151	32,510
Choppers	240	4,900	240	3,300	240	3,600	260	2,692	260	2,300
		51,980		47,300		43,600		41,377		41,874

age of imported stock foods, the time was not opportune for the introduction of a Stock Food Bill, although he agreed to have the matter looked into.

National Instruction Service

Reports from the nine District Pig Councils indicated a continued interest in the pig industry. This was borne out by the greater number of baconers produced, which entailed better accommodation and facilities for the longer feeding period, and a very noticeable improvement was evident in all districts as a result of the instruction and advice given by District Pig Council Supervisors. This instructional service alone, apart from other advantages, warranted the introduction of the 3d. per pig levy. During the past 8 years approximately £70,000 had been collected from this source, and it had been the means of returning to the farmer, by way of increased prices, subsidy on stock feeds, increased weight range for baconers, special schedule for winter pigs, and crop subsidy, something like £500,000.

Because of decreased killings, the returns from the 3d. per pig levy would fail to meet current expenses. Although a substantial credit was shown in the National Pig Industry Council's account, Mr. Fawcett said he felt that this should not be drawn on too heavily, as it would be some time before pig killings, and consequently the funds of the council, increased.

Mr. Keiller said he wished to congratulate the chairman on a report which he considered the best and most informative they had had presented to them. He thought one of the most important events of the year was the meeting with Mr. Chisholm, the newly-appointed London manager of the Meat Board. He was sure nothing but good could come of it, and also that the pig industry was fortunate in having a man of Mr. Chisholm's experience in all matters of pig-meat marketing. The table showing the total number of pigs killed for the year was most informative. It was, perhaps, depressing to see that for the last 4 years we had gone steadily downhill, but on the other hand it was pleasing to note that we were about 500 tons of pigmeat up on the kill of last year. This, while being detrimental to the finances of the council, was very good indeed, as it was weight and not so much numbers that was the all-important factor in an all-out war-effort.

Bacon pigs killed more than justified the action of the Pig-meats Advisory Committee in prohibiting the sale of pork on the local market. This undoubtedly was mainly responsible for the great swing-over from pork to bacon. The crop subsidy scheme, unfortunately, was not made as much use of by farmers as had been hoped, but as it was continuing for a further 12 months, he was sure that there would be a much larger response when farmers who held back saw what benefit others who did take it on derived from the scheme. We did not know, and could not tell until March of next year, what effect the crop subsidy scheme would have on our total kill for the year ending March, 1946, but he was sure there were more pigs in the country now than there were this time last year, and the indications were that there were more sows, which was most important of all.

The introduction of the 3d. levy on all pigs slaughtered to provide funds to operate the District Councils had proved of immense benefit to the pig-farmer, who has received his levy back many times over in numerous ways, said Mr. Keiller.

The council's financial position was most disappointing, but of course that was only to be expected with fewer pigs being killed each year. It was up to the District Councils to do their utmost to secure a steady improvement from now on, and in the meantime a smaller annual allocation per council must be expected this year.

In conclusion Mr. Keiller said he wished to pay a tribute to the Department of Agriculture, and in particular to the officers of the Livestock Division, who had always been courteous and considerate. He did not think the many little ways that the Department had contributed to the financial assistance of the council were generally realised.

Challenge

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VETERINARY NOTES

The Dehorning of Calves

AT this season, when a new crop of calves is being reared on many dairy farms, the question of dehorning frequently arises. The majority of the dairy breeds of cattle in the Dominion are horned, and if a dehorned milking herd is desired, the horn development in the young calves must be arrested or destroyed, or else the animals require to be dehorned at a later age.

There is no question of which is the better procedure, and again there is no question about the advantages to be gained from dehorning in the management and general production of a dairy herd. It is remarkable how the hornless beef breeds have been developed in recent years, so that today there are Polled Shorthorns and Polled Herefords, in addition to the long-recognised Polled Angus and Red Polled animals.

There is a distinct need for the development of polled dairy breeds, but, if these cannot be developed, there still remains the necessity of dehorning adult animals or of preventing the horn growth in the young calves. The large amount of damage to hides from goring, injury to udders, injuries from barbed wire indirectly due to goring, restlessness, nervousness, and lower production in such animals makes dehorning a necessity in a well-managed herd. The horned dairy bulls frequently become bad tempered with age, and many cases of injury to owners are recorded.

There is some reason for objection to dehorning in the case of pedigree animals, but there can be no objection in the case of grade herds. The best time to dehorn is to begin with the young calf.

The Operation

There are several methods of preventing the horn growth, and any one of them may be used with equal success. When the calf is a few days old the horn buds can be easily felt with the fingers. The hair should be clipped off around the bud, and the rubbing of a moistened caustic soda or potash stick over and around the base of the bud will effectually destroy the horn-secreting tissue and prevent horn growth. In wet weather the caustic may be weakened and may run over the face; otherwise the operation should be quite successful. If there is any doubt of the success of the first treatment, a second application should be made at the end of a week.

If the calves are allowed to grow older before the operation is carried out, the removal of the horn bud by means of a sharp surgical knife is recommended. First, clip off the hair around the horn bud, then raise the bud and skin with strong forceps and make a clean incision, removing the entire bud at its base. An application of Stockholm tar will prove useful in preventing bleeding and subsequent infection.

After a few years' treatment of heifer calves to be used for replacements in the herd the entire herd will be polled and the necessity for periodical dehorning of milking cows will be avoided.

Castration of Pigs

IN order to avoid the formation of castration abscesses, strict cleanliness should be observed in the piggery when this operation is being carried out. It is necessary to clean the site of operation, to use a clean, sharp knife, which has been sterilised by boiling for a few minutes, and to place the pigs in a clean sty or a clean pasture afterwards.

The incision should be made sufficiently large to ensure good drainage from the wounds, no pockets being left where clots or infection may be imprisoned when the skin wound heals up. The incision should be made at the lowest point when the pigs are in the standing position, or at the highest point if the pigs are being held on their backs during the operation. This will assist drainage from the wounds.

It is advisable to castrate the pigs at the age of three weeks, as the wounds heal quickly in young pigs. Strong antiseptics, such as iodine, salt, kerosene, or sheep dip, should not be applied to the fresh wounds, as the burning effect causes the young pigs to endeavour to remove the irritant immediately, which in too many cases leads to direct contamination of the wound.

Use either a non-irritant antiseptic (chinosol, or boracic in water), or none at all, or simply apply a dressing of Stockholm tar.

Post-castration abscesses should be avoided when these suggestions are followed.

[Bulletin 230, "Castration of Pigs," is available *free* from offices of the Department of Agriculture at Auckland, Wellington, Christchurch, and Dunedin. It is a well-illustrated and invaluable guide to this very important aspect of pig management.]

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Ringworm in Calves

ONE of the skin diseases frequently encountered among our domestic animals is that known as ringworm. Although the disease may attack man or any of the domestic animals, it is most commonly seen among cattle, the condition being most prevalent among young stock, such as calves and yearlings, and in cattle in poor condition.

Ringworm is a contagious disease. Animals become infected by direct contact with others suffering from the disease or indirectly from contaminated shelters, bedding or posts against which infected stock have rubbed themselves. The spread among animals is gradual, but it is much more rapid if a number are confined in a single pen.

Patches of various sizes may make their appearance on any part of the skin. The most common area for the lesions to develop is on the skin around the eyes and ears, and similar patches are frequently seen on the skin of the neck. The surface of the skin on these patches is greyish in colour and presents a dry, scaly appearance.

The cause of ringworm is a variety of fungi which lodges around the hair roots, the hairs becoming brittle and breaking off. The irritation brought about by this parasite produces a thickened and wrinkled condition of the skin on affected areas.

Many remedies are used in the treatment of ringworm, but before any are applied the skin should be thoroughly washed with warm water, soap and washing soda, the scabs being scraped off. This is done to allow the dressing to come in contact with the causal parasite. After removal of the scabs each patch should be dressed with tincture of iodine, applied with a stiff brush, making sure that every patch is thoroughly dressed. The treatment should be repeated twice further at intervals of five days.

Immediately after handling animals affected with ringworm or dressing the skin the attendant should thoroughly wash and disinfect his hands, being careful that he does not touch any other part of his skin before this has been done. If this precaution is not carried out there is a considerable risk that he may contract the disease.

Marking and Tailing of Lambs

IN the tailing and castration of lambs strict cleanliness should be observed in the use of the knife. Very serious abscesses in the purse have followed the use of a dirty knife or the making of too small incisions, which do not provide adequate drainage. In this respect the removal of the entire end of the purse, rather than making two incisions, has much to commend it.

It is said that such lambs do not provide a good cod when fat, but the removal of the end of the purse has much to commend it in regard to the reduction of scrotal abscesses and tetanus infection. Tetanus infection is rarely seen in a large, gaping wound; it is more commonly seen in punctured or healing wounds, when the infection is protected from the light.

It is a wise precaution always to use a fresh site for the marking of lambs. A few hurdles or a roll of wire netting should be used to provide a temporary enclosure for the operation. Old stockyards used year after year soon become heavily infected, and serious wound and joint infections have been contracted from such yards. Serious outbreaks of lameness and swelling of joints a few days after marking have been seen when old stockyards have been used.

Strict cleanliness and the use of temporary yards will do much to avoid lameness and thereby prevent a check in the lambs.

Answers to Correspondents

Dog with Throat Trouble

"B.R.F.," North Auckland:—

Could you give me a cure for a dog which has thick saliva in the mouth, with quantities dripping out? He can't seem to swallow anything; he picks food up and tries to throw it down his throat, which seems to be the trouble. He can't keep still very long.

LIVESTOCK DIVISION:—

The symptoms described in connection with your cattle dog indicate the presence of a bone or similar foreign body at the back of the

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throat. A gag should be placed in the mouth and a careful examination made to locate the cause of the trouble; something in the nature of a forceps or long-handled pliers would be necessary for operating. Due care should be taken to avoid being bitten in the process.

Dairy Cows with Fractures

"W.P.," Riverton-Gummies Bush:—

About four weeks ago I had a purebred Jersey cow injured while in season. The injury is apparently in the hip, and it looks to me as if a small piece has been knocked off the top of the bone. This piece can be seen and felt as a hard lump, about the size of my own knee-cap. No sharp edges can be felt, and the part can be moved about under the skin quite freely. The parts do not appear to be tender to the touch, but the cow can scarcely put her foot to the ground. After four weeks there is very little sign of any improvement, and I am wondering if the cow will ever recover.

A second cow, also purebred Jersey, slipped and fell in the cow-yard some two weeks ago, and exactly the same thing has happened with her. Both cows are getting up in years, and were in good condition and milking well on G.O.H.T.

I topdress and lime fairly heavily, and have been using plenty of bone-flour and salt lick. Never in all my 20 years of dairying have I had a similar case. If there is a chance of recovery, I could dry them off for the season. If not, they may as well be destroyed now. I may add that the lick used is my own mixture, as recommended by the Department of Agriculture. Up till recently I have managed to get the bone-flour, but lately it has been impossible to procure.

LIVESTOCK DIVISION:

The injury you describe is quite a common one, but the piece of bone which has been knocked off and which can be felt movable under skin is hardly likely to cause the more serious result that you state. It seems likely, therefore, that there is some additional injury in the vicinity of the ball and socket joint. Nothing of any real value can be done for it, but it is surprising what result sometimes follows in the course of time, say three months. The result, of course, will depend on the severity of the injury, but even bad fractures sometimes make reasonably good recoveries, and the cow is eventually able to get about satisfactorily; sometimes there may be a slight limp, and as the result of restricted activity some muscular wasting may be noticeable. If you thought fit, you should have the animals examined by the club veterinary surgeon.

The fact that you topdress and lime fairly heavily and that you have been using plenty of bone-flour and salt lick is all to the good, but it is unlikely that the condition of either of the two cows has anything to do with a deficiency, because the accidents you mention would be liable to cause the injuries described, apart from the existence of a deficiency condition.

Scabs on Cows' Udders

"D.A.J.," Papatoetoe:

I have two cows this year which have scabs (dry) upon the cavity where the udder joins the middle of the belly. I have put on a teat ointment, but this did not avail. I have been washing twice a day with strong disinfectant, but the scabs are still coming and going. One cow seems to have an intermittent suppuration, right in the deepest part of the hollow on the udder. What is the cause or cure?

LIVESTOCK DIVISION:—

The part should be thoroughly syringed out with a warm solution of bicarbonate of soda and water until the scabs can be removed. This should be followed by dressing daily with the following powder:—

Permanganate of potash, 1 dram.
Boracic acid, 2 ounces.
Animal charcoal, 2 drams.

When using this powder a proper "blower" should be used to avoid any danger of the powder blowing back into the eyes.

Skim-milk to Calves Through Galvanised Pipe

"J.S.G.," Morrinsville:—

Would you please let me know if you think it safe to pump skim-milk to calves through two chains of ¾in. galvanised pipe, the branch to be taken off a ¾in. line of pipe going to pig-sties about 3ft. behind pump. Water to be pumped through after separating is finished, the calf pipeline to be dipped along wall of dairy and then underground, and up to iron drum. The pipeline would lie full of water until next milking. Number of cows milked, 100; number of calves reared, 30.

LIVESTOCK DIVISION:—

The safety or otherwise of the pipeline in question would depend entirely on the degree of cleanliness in which it is kept. It would be advisable to clean out thoroughly this line before and after using, the water used for such purpose being directed into a drain and not into the milk drum.

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Supplementary Fodder Crops

FEED WISELY

As the result of seasonal conditions fodder crops in most parts of the country are below average.

This means that existing crops must be fed to advantage by either

(a) *Carting the crop out to the stock,*
or
(b) *Fencing into breaks.*

Feed hay with swedes, turnips, rape, and chou moellier to give a more balanced ration, and see that a good run-off is provided.

SEASONAL NOTES

Spring Sowing of Wheat, Oats, Barley

THE 1945-46 targets for the following cereals are:—

	Acres.
Wheat	**300,000**
Oats for threshing	**60,000**
Barley—malting	**38,000**
feed	**40,000**

Now that the time for spring sowing these cereals is approaching, it is hoped that as large an area as possible will be sown, so that the above targets may be attained.

Sowing

Spring-sown wheat and oats are drilled mainly in August and early September, while barley is sown in September or early October. All cereals sown in spring require about 15 per cent. heavier seeding than if autumn sown, because less tillering takes place with the spring-sown crops. The heavier the land, the heavier the seeding. Too light a seeding in spring may lead to development of late tillers and a higher percentage of shrivelled grain in the sample. The seed is drilled through every coulter to a depth of about 2½in., and tine harrows follow the drill. If available, only plump, heavy, machine-dressed seed of high germination and purity, preferably dusted for smut, should be sown. The usual seeding of spring-sown cereals is from 2 to 4 bushels per acre.

Fertilisers

The quantity of fertiliser allowed by rationing should be used with all spring-sown cereals. One noticeable effect is to strengthen the young plants at a time when they are liable to injury from grass-grub attack, and this alone may have an important bearing on yield. Grass-grub is active in August, and during September it usually goes into the resting stage, so there is some risk of damage to seedlings during August and early September on paddocks badly infested with grass-grub.

Preparation of Seed-bed

Tillage for cereals was discussed in the seasonal notes in the June issue of the "Journal." Ploughing still to be done should be carried out as soon as possible in order to avoid hastily-prepared seed-beds. The time which elapses between the various tillage operations is of greater importance than the use of a large variety of implements. The earlier the ploughing, the greater the conservation of moisture and the more mellow the soil. In preparing the seed-bed work the land down in successively shallower cultivations with the discs and harrows as sowing time is approached.

Spring-sown cereals, especially on light ground, are frequently rolled after drilling, if the ground is sufficiently dry. In districts of low rainfall or where the ground is heavy rolling is better delayed until the crop is about 9in. high.

Wheat

Spring sowing of suitable varieties of wheat is the usual practice in the North Island and in the moist districts of Otago and Southland. Autumn sowing is more general elsewhere. In Canterbury good yields are less certain following spring sowing, although spring sowings on heavy land not prepared in time for winter wheat usually yield satisfactorily. If the soil is considered too light, or if sowing is delayed too long, some other crops might be grown. For instance, peas, barley, or a forage crop such as rape or turnips might be better sown this spring and followed by wheat sown next autumn.

The principal varieties for spring sowing are Cross 7, Tuscan, and Tainui. Taiaroa and Jumbuck are also occasionally sown. Tuscan is still favoured in some localities, but Cross 7 has largely taken its place, being about a week earlier, more resistant to lodging, and very suitable for heading. In the North Island Cross 7 is used for earlier sowings on heavier soils or generally where fertility is high, such as after a clover crop. Tainui is popular in the north, but its weak straw renders it more liable to lodging. On lighter land or for late sowings it is more suitable than Cross 7. Tainui is essentially a spring wheat. It is the earliest maturing variety, ripening about a fortnight earlier than Cross 7 and a week earlier than Jumbuck. In Canterbury Tainui offers the best prospect of success when sowings are delayed by wet weather or through late preparation of the ground after swede or turnip crops are fed off late. Both yield and resistance to shaking are good, and the variety has largely displaced Jumbuck, which has loose straw, lower yield, is later maturing, and is not suitable for heading. Taiaroa, which is similar to Tainui, is occasionally grown in Southland and parts of South Otago.

Oats

While oats do better after grass than any other cereal, they demand less fertility, and may follow wheat. Oats should not be grown on very rich, moist ground, as they will go down. Oats probably receive the poorest treatment of the cereals, but good yields cannot be expected from exhausted or badly-cultivated soils.

Algerian oats, which are resistant to rust, are practically the only variety grown in the North Island, where they are grown for seed and chaff, or for greenfeed, ensilage, or hay crops with tares. In Canterbury this variety is autumn sown for green-

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feed and on heavier land is shut up in September or October for chaff or seed, for both of which there is a good demand from the North Island. On light land the oats are usually ploughed under, as the herbage becomes too woody for further grazing during September. The main spring oat variety of the South Island is Garton's Abundance, used chiefly for milling, but also for oatsheaf chaff.

Barley

Cape and Black Skinless barley are the varieties chiefly sown for feed. Usually they are autumn sown for greenfeed, and on heavy land they are left for a grain crop. Cape barley is also sown as a nurse crop for pasture, and is more satisfactory than oats.

The growing of malting barley is confined to areas of lower rainfall in parts of Marlborough, Canterbury, and Otago, where good harvesting conditions are the rule. A medium to good free loam is required. The malting varieties are usually spring sown and may follow peas, roots, grass, potatoes, or another grain crop. Sometimes the crop is sown on land on which the sowing of winter wheat has been prevented by wet conditions. In Central Otago barley follows a fallow, being autumn sown at Hawea but spring sown in other parts of the district.

Evenness of drilling and optimum rate of seeding to suit locality are of great importance in obtaining even grain quality.

Chevalier (a very old variety) and others have been largely replaced by varieties such as Plumage-Archer, Spratt-Archer, and Goldthorpe-Spratt, which have been bred to produce good grain quality and yield, together with sufficient strength in the straw and neck. Barley is delicate in the young stages, and only very light harrows should be used if it is necessary to kill young weed growth in the early stages. Rolling may also be considered advisable after the crop is well up.

Attention to Autumn-sown Cereals

ON good land where spring growth is vigorous light feeding off of cereals with sheep will prevent lodging, increase tillering, and improve the yield. Hard feeding off, especially on the lighter land, where grazing may not be advisable at all, tends to reduce yields.

Feeding off is generally carried out in August if the ground is sufficiently dry, but on very heavy land, if lodging is feared, it should be delayed until September. High per acre stocking for a short period will promote evenness in grazing, consolidation, and distribution of stock droppings.

After feeding off the crop should be tine harrowed to loosen the surface and scatter stock droppings. Harrowing may be beneficial even where the crop is not grazed, as on lighter country, to promote tillering and conserve moisture.

Farm Management

FARM management is the most important factor in economic production and farm improvement. The skill of management in co-ordinating the most suitable farm practices in running the farm is clearly reflected not only by returns but by the farm itself. Successful farming today is less a question of brawn than of ability. It is chiefly a matter of judgment, with effort directed by intelligent purpose and timely attention to detail.

Every farmer might well take stock of himself, review his past operations, and as far as possible aim to eliminate weaknesses in future management policy. There are few who could not profit by studying the methods of the more successful farmers in their neighbourhood.

Winter evenings afford opportunities of keeping abreast of the times by perusal of up-to-date agricultural literature. The farmer has to be a man of many parts—a combination of

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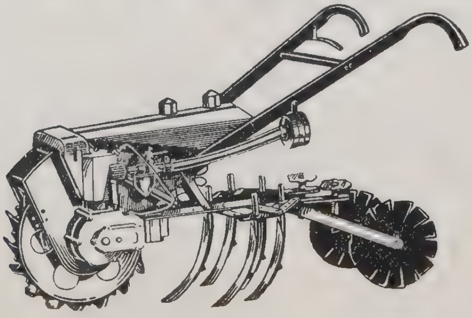

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working manager, business man, and natural scientist. He should have a comprehensive view of his main objectives and be in a position to carry these out.

Plan Ahead

By adhering to a schedule and a time-table as closely as is practicable farm work will be carried out more smoothly and in good season, with less peak labour demands. This presents less difficulty on dairy or grassland sheep farms, but many arable farmers are willing to plan ahead only vaguely, for fear of fluctuations in marketing or other possibilities. The regular and less speculative producer is concerned more with average prices for produce, and his management policy is more consistent and stable over a period of years.

A scale map of the farm, if necessary prepared by a surveyor, is of invaluable assistance in planning and estimating costs for many farm operations such as drainage, irrigation, water supply, shelter belts, rotations, stocking, or intended alterations to farm layouts. Such a map would greatly facilitate farm recording.

Grow the Crops: Breed the Pigs

THE decline in the production of pig-meats in New Zealand during recent years has been due to a number of factors. The number of pigs slaughtered in the season ended March, 1945, was 678,000, as against 1,003,000 in 1941.

Since the war has centred in the Pacific increased contracts have been made with this country for pig-meat supplies, 50,000 tons being the target for 1945-46.

The industry is again more settled, with the immediate need the pursuit of a policy of growing suitable crops which will surmount the coming winter feed difficulty. Two litters a year per sow are required in order to have the greatest number of pigs on hand during the dairy production period. The most efficient use of dairy by-products is achieved by taking the maximum number of pigs to beconers from the winter litters, with porkers and light baconers from the summer litters. To evade the winter difficulty some farmers sell weaners and stores by May as the milk supply dwindles. Others turn fairly well-grown stores out to grass with insufficient supplementary feed. The results are frequently disastrous, as body reserves must be heavily drawn on. Many permit the sows only one litter a year. The fewer pigs mean high overhead costs and wastage of milk products in the summer. The large numbers of underweight porkers killed late in the season and high prices of stores from August to December indicate the winter shortage.

Feed Requirements

To feed a sow for a year and produce 2 litters (14 pigs) will require:—

a. to weaner stage: about 3,000 gallons of skim-milk or 1½ tons of grain supplemented with meat-meal.

b. to pork stage: about 4 tons of grain (or its equivalent in skim-milk) supplemented with meat-meal.

c. to bacon stage: about 6 tons of grain (or its equivalent in skim-milk) supplemented with meat-meal.

Both milk and grain are partly replaceable by cheap home-grown feeds, and profit will largely depend on the degree of winter provision by way of roots, greenfeed, and pasture in such quantities as to be about half the total feed consumed. Crops required are practically all spring and summer sown, and every dairy farmer, while making provision for his cows, should also provide winter crops for his pigs.

For an average size dairy farm an acre in crop is usually sufficient for the pigs. One acre of good crops will be sufficient for 40 stores for a month or 10 pigs from weaners to sows for four months.

Crops to Grow

The main crops to grow are mangolds, sugar beet, carrots, and swedes, but several small areas of different crops in place of one area of a particular crop should be available to vary the diet. However, it is not wise policy to grow, for instance, 4 tons of artichokes where the same ground would produce 60 tons of mangolds or 20 tons of sugar beet.

Crops to be grown will depend on locality. Those covered by the £5 per acre crop subsidy scheme are mangolds, sugar beet, kumikumi, pumpkins, artichokes, chou moellier, swedes, carrots, silver beet, peas, maize, and barley. The necessity of growing one of the cereal or pulse crops is emphasised. It is not too early now to make preparations for next season's requirements.

Pumpkins and maize should be grown in the North Island wherever conditions suit these crops. Pigs are very partial to pumpkins, kumikumis, and marrows, which are fed before mangolds, as the last-named keep well into spring and serve to supplement the early milk supply. A small area in maize is easily managed, presents no difficulty in harvesting, and is excellent for feeding pigs or farm poultry. Turnips and swedes are not relished by pigs, but are useful as a winter maintenance. Sugar beet is the best of the root crops for pigs. Unlike mangolds they require no ripening period, and may be consumed at any stage of growth. The tops are of high feeding value, and may be fed off early before the roots are lifted. As less than 5lb. of sugar beet is equal in feeding value to 10lb. of mangolds, pigs have no difficulty in eating enough for requirements. The food value also is comparable to that of artichokes and potatoes (which require boiling), but the yield is much higher. A 30-ton crop of sugar beet is approximately equivalent to six tons of barley. If about ¼ acre of sugar beet per sow is grown, this will supply the bulk of feed for winter

Maize is easily managed, is not difficult to harvest, and is excellent for feeding pigs or farm poultry.

litters farrowed during the autumn. A rotation of sugar beet and new grass in pig paddocks has given excellent results in wintering and fattening store pigs. Barley and peas require harvesting machinery, which is not available on the dairy farm, and as much labour is involved if these crops are fed from the stack or the climate is unsuitable, the dairy farmer usually buys his supplies if maize cannot be grown.

Flesh-building Protein

Roots and cereals are low in protein and must be fed with some protein concentrate such as meatmeal, which is the best winter supplement, but is closely followed by linseed meal and peas. Young pigs require a higher proportion of protein in their diet, but the quantity required remains at about the same level as the animal grows. Over the period of development, however, increasingly large quantities of the energy- and fat-forming foods such as roots, grass, and grain are consumed.

Feeding Points

Every endeavour should be made to obtain good weaner weights, as this is the first step in profitable pig production. On these weights will depend, in the first place, the extra time taken to finish pigs off as porkers and baconers. Pigs should be fed regularly three times a day and young pigs a "little and often." Litters and weaners entering the winter should always be given the dwindling supplies of separated milk, but deficiency of protein must be made good in the ration. Creep feeding may be commenced at 3 weeks with a little skim-milk and meatmeal. At 8 weeks about 2 gallons of separated milk is required if milk is plentiful, and up to ½lb. of meatmeal may be allowed. This quantity is very necessary if the milk available is less than one gallon. In the absence of skim-milk in winter grain, roots, and grazing are used to make up the ration, and should be introduced gradually into the diet as the pigs grow older.

Each gallon of skim-milk may be replaced by 1lb. of grain or 10lb. of roots (sugar beet 4-5lb.) in the ration, together with protein supplement. For instance a 40lb. pig normally requires 2 gallons of skim-milk, but if less skim-milk were available, 1 gallon of skim could be substituted by 1lb. of grain and the ration would be: 1 gallon of skim-milk, 1lb. grain, ½lb. meatmeal.

Increasing quantities of home-grown food should be gradually included as weights increase.

If crops such as swedes are available, they may be fed to appetite, with other crops for variety and balanced with concentrates. As skim-milk becomes available stores should be stied and finished off as baconers.

Feeding the Sow

Although the sow may be grazed on the best of pasture, reasonable supplementary feeding is required, and from about a month before farrowing, depending on condition, the daily ration should be 1lb. of meatmeal and 2lb. of grain. Some roots may be an advantage, depending on the pasture. Inadequate feeding of the pregnant sow is a common cause of abortion and weak litters.

Grass Runs

Grass runs should not be used as holding paddocks. Overstocking or prolonged grazing fouls the feed and weakens the sward. Subdivision with movable sties will allow for spelling to produce fresh growth from denser and more vigorous ryegrass swards. Grass is cheap and effective for the health of all classes of pigs, but some ringing will be required.

Hygiene

Skim-milk is particularly susceptible to disease infection in warm weather, and containers and pipe lines need regular attention. Stale food should not be left in troughs, but only sufficient should be fed out in order that none will be left after each meal. Irregular feeding, gorging, too early weaning, or any sudden change in diet will also cause digestive troubles. Unthriftiness may occasionally be due to lack of minerals such as lime or salt, but most likely will be due to faulty feeding or management.

Many diseases—and young pigs are most susceptible to disease—are associated with insanitary conditions due to overcrowding, unsuitable, badly-drained sites, and dirty and draughty sties. Pigs are as clean as the owner permits, but conditions are sometimes deplorable. Rear healthy, profitable pigs by growing the feed and breeding the pigs, by regular feeding in regard to time and amount, and by careful management.

—*E. M. BATES, Instructor in Agriculture, Alexandra.*

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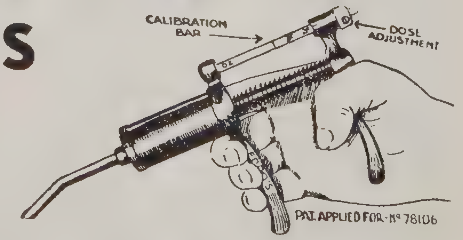

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ORCHARD AND VINEYARD

Pruning, Spraying, Manuring

PRUNING of both stone and pip fruits was dealt with in the notes in the two previous issues of the "Journal," and every effort should be made to complete this work as early as possible.

The essentials to be followed in pruning in order to obtain the best results are:—

1. Elimination of over-crowding leaders.
2. Removal of old and exhausted fruit spurs to make room for new fruiting laterals.
3. The spacing, as far as possible, of all fruiting wood so that the maximum amount of sunlight can penetrate through the tree.
4. The maintainance of fair, average growth every season.

If these points are observed, it will help considerably in the production of crops of good quality and quantity, and may correct, to some extent, the biennial cropping habits of some varieties.

All prunings should be gathered up and destroyed either as pruning is proceeding, or as soon as possible after operations are finished. By the thorough destruction of prunings many pests and diseases, which otherwise may be a source of infection later in the season, will be effectively destroyed.

Often fruit-growers do not give this work sufficient consideration, but merely collect the heavier prunings and deposit them at some convenient spot on the headland, or in some vacant space adjacent to the orchard, where in some cases they are allowed to remain for several years without attention.

Spraying

As the season for spraying is now approaching, consideration should be given to the overhaul of the spraying outfit at the earliest opportunity. The engine and pump should be thoroughly cleaned and oiled and any broken or worn-out parts should be replaced, so that the outfit will be in good working order when spraying operations commence. Hose and nozzles should be tested to see that there is no leakage.

The spraying programme commences with applications of insecticides, principally for the destruction of scale insects and red mite eggs. Winter oil at a dilution of 1-20 is recommended for this purpose, and, should it be necessary to use oil at this strength, care should be taken to apply it before any pronounced bud movement, in order to avoid damage to buds. By the end of July most stone fruit trees should be at a stage when little or no damage would result from the spray applications recommended above.

The most troublesome of the scale insects is **San Jose scale.** Every effort should be made to control this pest, as its spread is very rapid and most destructive. Badly-infested portions of trees should be cut out during pruning and immediately destroyed. The remainder of the tree should be thoroughly sprayed, so that all portions receive a complete coverage, which is essential in the control of all pests and diseases.

Red mite, which becomes troublesome in most districts, is rather difficult to control, but can be kept reasonably well in check with winter oil at a dilution of 5 per cent.

For the prevention of **peach leaf curl** and other stone fruit diseases Bordeaux mixture at a strength of 5-4-50 should be applied when the fruit buds begin to swell and the bud scales begin to lift. One application at this strength should be effective in the control of leaf curl on most of the varieties grown.

A knowledge of the life history and habits of pests, the seasons when they are prevalent, and whether they are sucking or chewing insects, fungous diseases, or bacteria is always helpful in disease control.

Cleanliness or orchard sanitation should be practised in all orchards, as this is a decided factor in the control of insect pests and fungous diseases.

Manuring

In order to obtain the best yield of good-quality fruit, trees must be supplied with sufficient food. Large quantities of plant food are withdrawn from the soil every year, and, unless this food supply is replaced by a judicious manurial programme, growth and yield will suffer.

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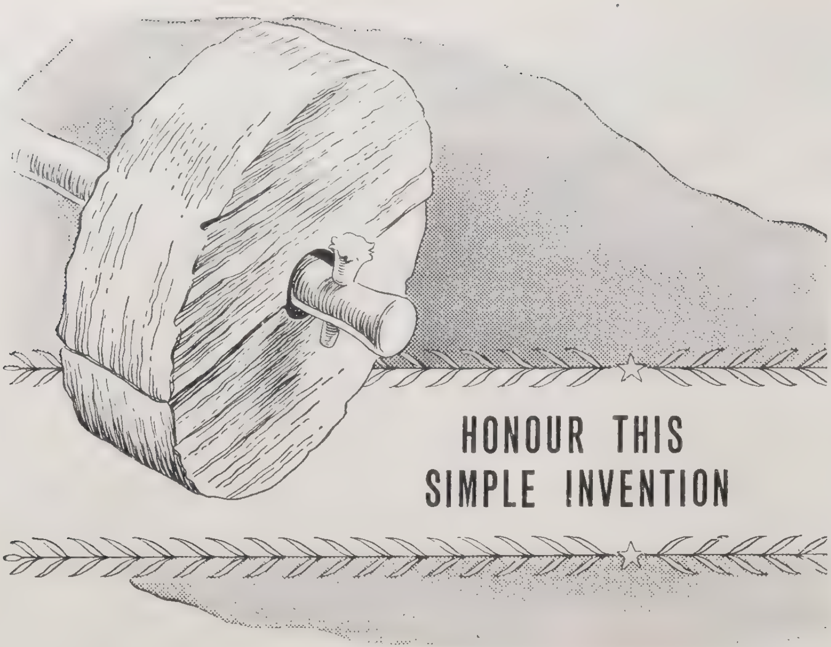

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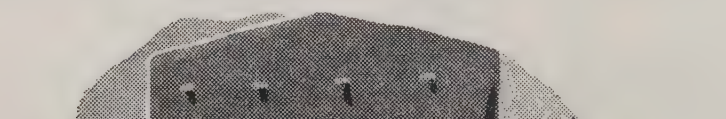

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All fruit trees require the common plant foods—nitrogen, phosphoric acid, and potash—for normal tree growth and fruit production. Although it may be necessary to vary manurial programmes in the different districts, according to the nature and fertility of the soil, it should be remembered that any expenditure on manures and fertilisers will assure better results in tree and fruit production in the future.

Any nitrogenous manure produces growth and heavy foliage, and consequently can be used on trees that have become debilitated. With the average growing tree an excess of nitrogen is liable to cause sappy growth, unripened fruit buds, and fruit of poor colour and open in texture. It would also adversely affect the keeping qualities of the fruit.

The average rate of manurial applications should be from 3lb. to 6lb. per tree of balanced fertiliser, according to age, growth, and cropping. Approximately half the quantity should be phosphoric acid in the form of superphosphate, a quarter in potash in the form of either sulphate or muriate, and a quarter in nitrogen in the form of sulphate of ammonia.

Phosphate and potash should be applied early, so that ploughing will turn them deeply into the soil. The best results will be obtained if nitrogen is applied just prior to fruit set.

Planting

Where trees have been received for new plantings or replacements they should be heeled in firmly until soil conditions in the orchard are suitable for planting. They should be planted approximately 1in. deeper than they were before being lifted from the nursery. At the time of planting an application of blood and bone at the rate of about ½lb. per tree will be beneficial.

—D. J. HOGG, Orchard Instructor, Mapua.

ROPES

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HOME GARDEN NOTES

August Work Basis of Success

> *"The book of life begins with a man and a woman in a garden."*
> —*Oscar Wilde.*

AUGUST may be looked upon as the cultivation spring-board for the coming season's vegetable-growing activities. Much of the success achieved will doubtless be due to the work carried out during this month. As previously emphasised in "Journal" notes, the area to be cultivated should be planned for maximum production, and the plan adhered to.

When selecting sites for different varieties of vegetables rotation of crops should be considered as essential not only for the production of the best vegetables, but for maintaining the soil in the healthiest possible condition. Beds for carrots, parsnips, and celery should be as far removed as practicable from the areas previously occupied by these crops, which are attacked by the carrot rust fly, preferentially in the order mentioned. Club root is sure to become established in any soil where plants of the cabbage family are grown successively on the same area. Crop rotation is also a means of protecting the soil against depletion of so-called rarer elements, which, though present in the soil in small quantities, are nevertheless essential for high-quality vegetable production.

Potatoes

All preparations should be made for planting potatoes as soon as the risk of serious damage by frost is past. Seed should be properly boxed and kept where there is plenty of air circulating, so that developing shoots will not become spindly and weak. Such growth cannot be expected to produce an abundant crop of healthy tubers.

Artichokes (Jerusalem)

Artichokes are not a very popular crop in home gardens, but they have a particular medicinal value for persons affected with diabetes. They are hardy, relatively immune from disease, and can be grown in much the same way as potatoes. A small part of the garden should be selected where the crop will not interfere with vegetables which do not occupy the soil over such a lengthy period.

Cauliflower

Early London is a variety of cauliflower suitable for early spring planting. If it is necessary to buy plants, an effort should be made to obtain this variety. Well-grown plants set out in good, rich soil, and grown without a check, can be harvested before Christmas.

Asparagus

Asparagus is a so-called luxury crop, but one well worth growing for the change of vegetable routine it provides, and for the length of time it can be harvested from a well-established bed. August is the appropriate month for planting, and the best of one-year-old crowns should be selected. The area intended for planting should be deeply trenched, and plenty of well-rotted stable manure, farmyard manure, or compost incorporated with the soil. All perennial weeds should be destroyed.

The young crowns are usually set in a prepared trench, not more than 8in. below the soil level of the garden, and with about a 2in. covering of soil. The young roots of the crowns should be carefully spread out and not bunched together. Planted in this manner, subsequent cultivation will gradually fill in the trench; but this should not be done till the second season after planting.

Onions

Autumn-sown onion seedlings should now be ready for setting out. Early planting is essential for the production of bulbs which will store in good condition for the maximum length of time. Owing to the long time this crop occupies the ground from planting to maturity, a slow-acting fertiliser is best, and bonedust is most popular among commercial onion-growers. It is best applied 2 to 4 weeks before planting, and should be broadcast at the rate of 3 to 4oz. per sq. yd., afterwards being well worked into the soil.

The seedlings' roots should be trimmed to 1½in. long before planting, and these merely pressed into the soil. The small bulb should not be buried, particularly on heavy soils, as this will restrict bulb development.

Shallots

August, generally, is also the month when shallot bulbs may be set out. If the soil in which the crop is to be grown has previously received a substantial dressing of farmyard manure, no further application of fertiliser will be necessary. In the absence of

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this manure a light dressing of blood and bone 2 to 3oz. per sq. yd. well worked into the top soil will give good results. Rows are usually 12in. apart with 8in. spacing between the bulbs.

Cabbage

In favourable localities cabbage plants of the Golden Acre variety may be set out towards the end of August, although, as a general rule, September is the better month. It will be much better for the young plants if the ground is prepared two or even three weeks before planting. Home gardeners who desire to have a continuous supply of cabbages would do well to secure plants. If seed has not been sown, bought plants can be "heeled in" until required later. To "heel in" plants a trench is made in which the seedlings are placed at the same depth as that at which they were grown from seed. When being placed in the trench the plants should be separated and soil pressed firmly against the roots. Seedlings which have been heeled in should not be pulled; when being removed for transplanting they should be eased out of the trench with a hand fork and re-set with as much soil as possible adhering to the roots.

Tomatoes

If it has not already been done, the first thing necessary to make sure of the production of strong, healthy tomato plants is to sterilise some soil in which to sow seed and later grow the seedlings. For directions to sterilise a small quantity of soil properly and cheaply "Journal" readers are advised to write to their local office of the Department of Agriculture for a free copy of the "Dig for Victory" publication "Vegetable Production in the Home Garden." The booklet illustrates how to sterilise soil in an ordinary wash-house boiler so that it will be practically free from disease.

A small quantity of tomato seed may be sown in a 3 or 4in. flower pot or in almost any container of similar size, provided provision has been made for drainage. The pot should be filled with sterilised soil, on top of which a small quantity of seed can be broadcast and lightly covered with some of the sterilised soil which has been passed through a fine sieve. When the job is finished the pot should be covered with a piece of light-coloured paper and set in a sunny porch or in a kitchen window. As soon as the seed begins to germinate the covering must be removed.

Spring Cabbages

After cold winter weather, particularly if soil conditions were such that not much cultivation could be done, weeds may have become prominent among spring cabbages, and the plants may lack that vigorous growth and dark green colour which are always indicative of healthy cabbages. Under these circumstances hand weeding is desirable, and the bed should be thoroughly cleaned up before any nitrate of soda, either dry or as a liquid manure, is used. Several applications may be made at 3- or 4-day intervals during August, after which no further nitrogenous fertiliser in any form should be used.

The remarks on spring cabbages are also applicable to silver beet and leeks.

Green Manure Crops

Green manure crops which it is intended to follow in early spring with a vegetable crop should be turned under without delay. If vegetable plants are set out on an area where a green manure crop has just been dug in, serious inhibition of growth may result, and would be almost certain if the digging in of the green substance was followed by a period of dry weather. Where the green manure crop is a leguminous one, such as lupins, the greatest benefit to the soil will be obtained if it is allowed to grow to maturity, or at least until it is in full bloom. If this practice is adopted, the application of sulphate of ammonia 1oz. per sq. yd. of the area in crop, **before digging in**, is recommended. This nitrogenous fertiliser should be dug in with the green manure, following which plants set out in the area dug should be kept well watered.

—*D. K. PRITCHARD, Instructor in Vegetable Culture, Wellington.*

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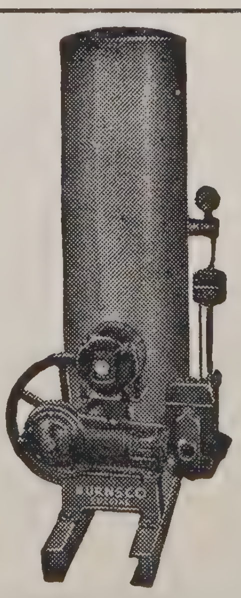

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Gives solid, crisp hearts up to 2 or 3lb. in half the time other varieties take.
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NOTES FOR BEEKEEPERS

Transport of Bees and Equipment

THE shifting of bees to new locations can be carried out readily, provided sound standard hive equipment is used. Bees must not be moved to a new location, however, without first obtaining a permit from the Apiary Instructor for the district, a precaution which is necessary to prevent the possible spread of bee diseases.

Best Time to Move

While colonies of bees may be moved safely to new locations during the winter, the best period is the early spring, when the bees have commenced to break away from the winter cluster. At this period the hives contain a comparatively small number of bees, and stores of honey have been considerably reduced. Furthermore, very little brood will be in evidence at this time of the year. When hives are located for any length of time in one position the flying bees take full observation of every landmark, but in winter, when there are shorter periods of sunshine, the flight of bees is necessarily curtailed. In addition, there are often periods of several days together during which the bees take no flight at all; consequently they must renew their acquaintance with their surroundings when an opportunity for flight does occur. Therefore, if hives are moved during a spell of bad weather, the bees will take more readily to their new location when a fine day comes. This applies more particularly when the hives are shifted only a short distance from their original position.

Short Shifts

Where odd hives require to be removed only a short distance on the same property very little preparation is necessary. In the winter time, during a spell of bad weather, the hives may be picked up bodily and carried over to their new location, after pushing a handful of grass in the entrance to each hive to prevent the bees from coming out. If a similar shift is carried out during the summer, a considerable number of field bees will drift back to their old location. No loss of bees need occur, however, if a hive or a nucleus box is placed on the old site to collect the stray bees, which may be removed during a spell of wet or dull weather. Another method is to shift the hives only a few yards each evening until the new position is reached.

Longer Shifts

To move bees long distances successfully necessitates considerable preparation to see that the bees are completely confined, but are at the same time provided with adequate ventilation. The most important factor is ventilation, neglect of which often leads to heavy losses when bees are being removed. Before preparations are commenced, however, consideration must be given to the means of transport, as this will govern, to a large extent, the method of preparing the hives.

Rail Transport

Transport by rail has never been popular with beekeepers for the very good reason that many have had some rather unfortunate experiences in using this method. In most cases where losses have occurred proper attention was not given to certain details which are absolutely necessary if this means of transport has to be used. To ensure successful transport of bees by rail the following precautions require to be taken.

1. All combs heavy with honey should be removed from the hives and replaced with empty combs or even frames only. Leave only sufficient honey for the bees during the journey and until stores can be replaced.
2. The frames should be evenly spaced and securely held in position to prevent undue movement and the attendant risk of crushing many bees. Hoffman self-spacing frames are best for shifting colonies of bees.
3. Ventilation should be provided by means of a wire screen securely nailed on to the top of the hive after the lid and mat have been removed. If sufficient screens are available, one may also be placed between the bottom super and the floor-board. The use of this bottom screen could be dispensed with, however, except in instances where the colonies are extremely strong in bees, and may be replaced by securely fixing a piece of wire gauze over the entrance as shown in Fig. 1. The supers should be thoroughly fastened together to prevent any movement and the escape of bees. Shifting bees by rail transport in anything but thoroughly sound hive equipment should never be undertaken.
4. To be reasonably sure that the bees will arrive at their destination in a sound condition make certain that a ventilated wagon is supplied. Place the hives so that the combs run parallel and the entrances face the direction of travel. In this position they are best able to take any sudden jolts during transit without crushing bees between the combs. If space will allow, leave a few inches between each hive, as this will allow a current of cool air to circulate around the hives.

To appreciate the necessity for all the above precautions the beekeeper should understand what happens when bees are being moved to a new location. The constant vibration during transit tends to disturb the bee cluster, and the resultant excitement is sufficient to raise the temperature of the hive considerably, so that the bees are in very great danger of being suffocated and the brood scalded unless adequate ventilation is provided. This rise in temperature is sometimes sufficient to melt the wax in fairly new combs and allow any honey to run out. The writer has seen colonies opened up after a train journey when it has been impossible to separate the suffocated bees from the sticky mess of melted combs and honey. Such conditions resulted from the owner's neglect to see that the Railways Department supplied a ventilated wagon. All other precautions had been taken.

Road Transport

Experience has shown that the most satisfactory method of transporting bees is by motor truck. Adequate ventilation is assured, and if the shifting is done during the hours of darkness, the bees will travel more contentedly. Another great advantage is that once the colonies are placed on the truck at the apiary they are not disturbed again until delivered at their new location. This is a very definite saving in labour, and the equipment is subjected to the least possible amount of handling. The stapling of hives and the fitting of wire screens should be done before the actual shift commences. This allows the bees to settle down after the unavoidable hammering on the hives. All that remains to be done when transport is available is quickly to block up the entrances with wire cloth as shown in Figs. 1 and 4, using cleats of wood to hold the wire cloth in position.

Stretcher for Carrying Hives

It is often impossible to get the truck right up to the apiary, and in such cases it is necessary to carry the hives for a short distance. The hive stretcher shown in Fig. 5 is very helpful on these occasions and ensures the bees being moved about with a minimum of disturbance and great convenience to the operators. Such a stretcher is very valuable permanent equipment in any apiary. Wire screens which are necessary when moving bees will be found very useful as covers when bringing in a load of honey from the out apiary or when storing supers during the winter.

Construction of Screens

For the economic use of wire gauze the framework of the screens should be made of wooden strips about 1¾in. wide and just under ½in. thick, which will allow an inch flat-head nail to join the two pieces together and leave the point to be clinched over, thus binding the strips strongly together. The wire cloth, which is purchased in 3ft. widths, should be cut up the centre and divided into strips each 15in. x 18in. By cutting the cloth this way sufficient material to make four screens is obtained from a piece 2½ft. long. The wooden strips should be lapped over to ensure strong corners, the timber required for a screen being four pieces 18¼in. x 1¾in. and four 14¼in. x 1¾in.

Fig. 1—Hive prepared for removal by truck. Supers are held together by crate staples, and the entrance is closed by wire gauze held in place by two strips of wood.

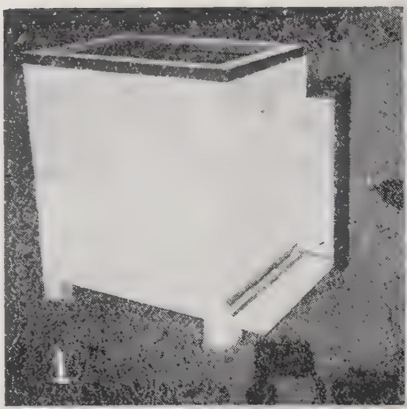
Fig. 2—Strips of wood used instead of staples. These strips take up extra space and may prevent an extra row of hives being placed on the truck.

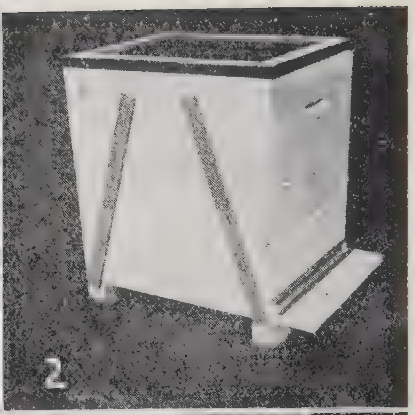
Fig. 3—Hive prepared for removal by rail. Wire screens placed top and bottom.

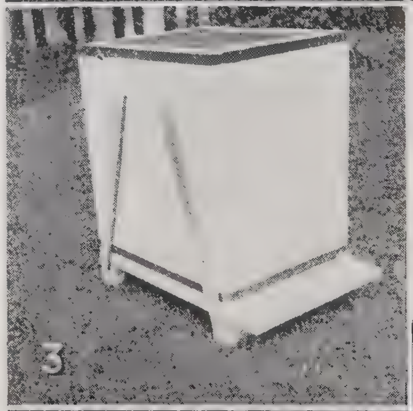
Fig. 4—Closing entrance by means of a strip of wire gauze.

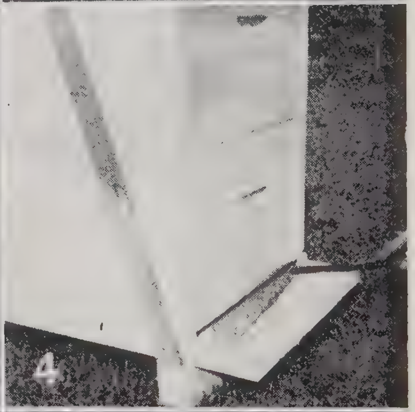
Fig. 5—Handy stretcher for carrying hives to or from the truck.

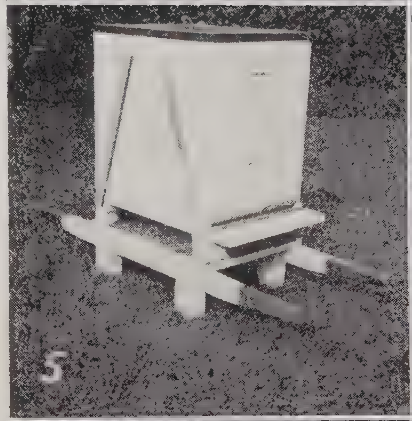
Figs. 6, 7, and 8—Method of removing by car or truck bees housed in unsound equipment.

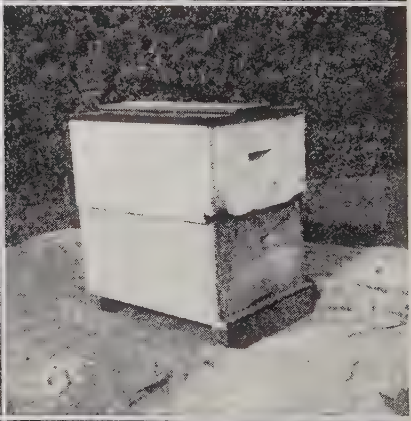


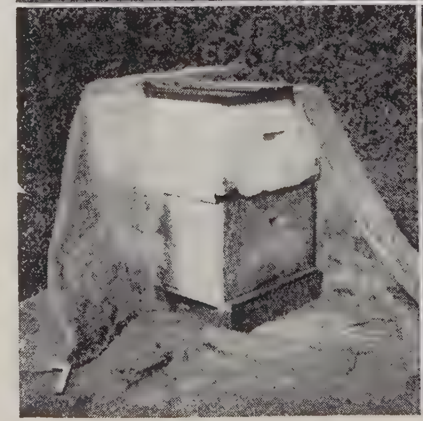


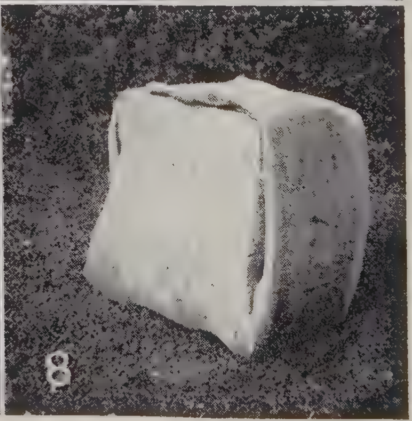












Moving Unsound Equipment

At times it is necessary to move odd lots of bees where the equipment is ill-fitting or in unsound condition, so that it is impossible completely to close in the bees for shifting. Figs. 6, 7, and 8 demonstrate the method of dealing with such hives.

—*C. R. PATERSON, Apiary Instructor, Hamilton.*

POULTRY KEEPING

Feeding and the Feed Shortage

WITH the approach of the rearing season and with no prospects of having the normal range of foodstuffs from which to select or mix up chicken mashes, poultry farmers are giving serious thought now to this year's feeding programme. Two major problems have to be considered: what meals will be available and will the quantity of these be sufficient to carry through the normal rearing of replacements for the farm. Unfortunately it is not possible to offer a complete solution to either of these problems, but the situation may be examined and certain alternatives discussed.

The first and important fact to be faced is that there is little likelihood of any additional supplies of pollard and bran being made available during the rearing season. Some producers have been fortunate enough to be able to store even a limited quantity of pollard and bran against the rearing season requirements; others who have not been so fortunate have indeed a problem ahead of them, unless they have purchased alternative foods or are lucky enough to get some increases in supplies during the coming critical period.

Severe Culling

It is obvious that, if additional foods are not available, or there are no reserves to draw on, laying stock must be severely culled throughout the rearing season. Every low or non-producing bird sold off the farm means more food for the young growing stock. Unfortunately, on some farms it will probably be necessary to dispose of the older breeding stock immediately the breeding season is completed. This will mean an immediate financial loss to the poultry farmer and a decreased number of eggs available to the public. Although the selling off of birds in lay is to be deprecated, it is preferable to raise a normal number of replacement pullets for next laying season.

Any serious reduction in the number of pullets raised must cause a serious financial loss during next winter, when egg prices are high, and perhaps even more important is the fact that a reduction in the pullet flock next season must result in a reduced number of breeding stock in the subsequent year, unless the standard of breeder retained is lowered or resort is made to breeding from pullets. Both alternatives are a retrograde step, and could result in serious repercussions on the farm for several years. It is always easier to slip back in quality of stock than to build up quality. The hard facts are that food will not be more plentiful this year, and that what is available must be fed to the very best advantage. No bird about which there is a doubt as to the economic value should be retained on the farm one day longer than absolutely necessary.

Adequate Supplies

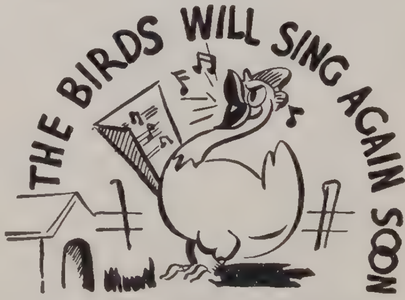
The only comfort to be offered is that successful steps have been taken to ensure an adequate supply of wheat for all poultry farmers. Any temporary shortage will be due to shipping difficulties, which unfortunately cannot be entirely obviated, and adequate supplies are anticipated from August onwards.

Poultry farmers are reminded that the soaked wheat method of feeding poultry is satisfactory when carried out correctly. It offers a means of conserving pollard and bran, although the latter is used to the extent of 8 to 10 per cent. to dry off the soaked wheat. Full details of soaked grain feeding may be obtained from Poultry Instructors or on application to the Department of Agriculture, Box 3004, Wellington.

Poultry producers should receive adequate supplies of wheat and restricted quantities of pollard and bran. The latter may be considerably augmented by gristing a part of the wheat supply into wheatmeal, usually referred to as "stockmeal" when imported from Australia. That adequate supplies or even limited supplies of maize or maizemeal will not be available to many poultry keepers during the rearing season is a serious loss to the industry. Unfortunately there is no direct or adequate substitute for maize available at present. Consequently rations must be constructed without this valuable foodstuff. In fact, apart from oats and peameal in certain districts, there are no straight meals to which the producer may turn to augment the reduced supplies of normal poultry foodstuffs, if homegrown barley and maize be excepted.

Many waste products of the seed industry which are normally unwanted have been purchased and will be used to bulk ready-made mixtures. These will not necessarily be injurious to poultry, but have not the feeding value of poultry food in use in normal times.

Difficulties were experienced last year in obtaining adequate supplies of meatmeal for the poultry industry. Poultry farmers in some districts were sometimes unable to obtain even limited supplies. The position should be improved this year by the cancelling of export licences for livermeal, thereby forcing this valuable protein concentrate on to the local market. Unfortunately the export price of livermeal was well above a level at which it could be purchased by poultry producers. It is likely, therefore, that some of this livermeal will be incorporated with meatmeal, while special products containing livermeal may be offered to poultry producers. These are likely to be at a higher price than ordinary standard meatmeals, but the comparatively small quantity used in raising chickens will not make the additional cost serious. A good protein concentrate at a higher price is a better proposition economically than feeding a ration containing insufficient quantity or even no meatmeal. Fortunately livermeal contains a vitamin food accessory—riboflavin—which is particularly valuable for young growing chickens. There is a keen demand for riboflavin-rich livermeal for poultry in the United States of America, and manufacturers have been able to build up a profitable export market. What is considered to be valuable for feed-


THE BIRDS WILL SING AGAIN SOON

But in the meantime all lines are in very short supply, and it is difficult to advise customers when supplies will increase.

From the limited stocks arriving, and in store, we are able to supply the following:—

Molasses, Grits, Chaff, Meatmeals, Oats, Wheat, Laying Mashes, Wheatmeal, Seed Potatoes (most varieties), Table Potatoes, Onions, Hay, Straw, etc., Laymoor Poultry Spice, etc., etc.

Please understand that if your orders are not railed, or shipped as promptly as previously, it is because stocks are not immediately available, but the order will be sent on as soon as possible.

Your co-operation will be appreciated.

A. M. DOULL & CO.

60 HOBSON STREET, AUCKLAND.
PHONE 41-735.
Telegrams, "Rowallan," Auckland.

ing to chickens in the United States of America must be of equal value for the chickens in New Zealand, and genuine livermeal products can be recommended to producers.

Alternative Food Mashes

A number of chick and growing mashes making use of alternative foods which may be available to poultry producers are given below. It will be noted that ground oats are included in these rations. When using oats a plump, short oat with the minimum of husk is preferable, and the meal from these should be ground reasonably fine. Poor oats show a high percentage of husk and are of low feeding value to poultry. Speaking generally they are an uneconomic food, even if the price is comparatively low. Peas are comparatively high in vegetable protein and should be used with discretion. They are not recommended in quantity for young chickens. A comparison of the analyses of oatmeal and peameal emphasises the point regarding the protein content.

VITE-ADEE

for

Healthy Hens

NOW that rations are short, it is more than ever necessary to take special care of the health of the flock. Feed VITE-ADEE and ensure adequate Vitamin A & D intake for your hens. VITE-ADEE is a scientifically processed and concentrated Fish Liver Oil, containing 1,500 International Units of Vitamin A, and 200 Units of Vitamin D per gramme.

Vite-ADee is not a forcing mixture. It is a vitamin food which will vastly improve the general health and stamina of your flock. To get the best results, Vite-ADee should be fed on the following scale:

Chicks 1% to 2%
Layers 1% to 1½%
Growers ½% to 1%
by weight of daily rations

The lower scale is ample except under the intensive all-indoor system.

For further particulars, write now to:

W. & R. Fletcher (N.Z.) Ltd.
Box 663 Wellington.

	Protein.	Oil.	Carbohydrates.	Fibre.
Oatmeal ..	7%	4%	48%	10%
Peameal ..	17%	1%	52%	5%

These percentages refer to the digestible units present in each case, except in the instance of the fibre.

CHICKEN MASHES.

Suitable for use from 1 to 7 weeks of age.

1.	lb.
Pollard	62
Bran	20
Milk powder	8
Meatmeal	8
Minerals	2
	100

2.	lb.
Pollard	40
Bran	20
Wheatmeal	20
Milk powder	8
Meatmeal	10
Minerals	2
	100

3.	lb.
Pollard	30
Bran	20
Wheatmeal	20
Oatmeal	10
Milk powder ..	8
Meatmeal	10
Minerals	2
	100

4.	lb.
Pollard	40
Bran	20
Oatmeal	20
Milk powder	8
Meatmeal	10
Minerals	2
	100

5.	lb.
Pollard	30
Bran	20
Wheatmeal	24
Peameal	10
Milk powder	6
Meatmeal	8
Minerals	2
	100

GROWER MASHES.

For use from 8 weeks to laying stage.

1.	lb.
Pollard	36
Bran	30
Wheatmeal	26
Milk powder ...	3
Meatmeal	3
Minerals	2
	100

2.	lb.
Pollard	41
Bran	25
Oatmeal	25
Milk powder	3
Meatmeal	4
Minerals	2
	100

3.	lb.
Pollard	31
Bran	30
Wheatmeal	25
Peameal	10
Meatmeal	2
Minerals	2
	100

In all the mashes given the minerals may be made up of 1lb. common salt (free from lumps) and 1lb. oyster shell dust (or limestone flour). Taking into consideration present-day quality of pollard the first chick mash (No. 1) quoted is not particularly recommended. Mashes containing wheatmeal are recommended in preference, as the latter puts into the mash body which is lacking in pollard at present. In all the growing mashes the protein concentration—milk powder and meatmeal—must be reduced after the birds are approximately 12 to 14 weeks old. Unless this is done, there is a possibility of the pullets "reddening up" too soon.

Chick Sexing

A CHICK-SEXING examination was held by the Department of Agriculture at Upper Hutt on May 22, 1945, when one candidate presented himself for examination.

Mr. J. A. Prosser, of Foxton, sexed 200 chicks in 40 minutes with an accuracy of 97 per cent., and qualified for a Chick-sexing Certificate. Mr. Prosser will be sexing in the Auckland Province during the hatching season, and all who wish to obtain his services are recommended to obtain his present address from the Poultry Instructor at the Department's office in Auckland.

Poultry farmers in the Auckland Province may secure the services of two new chick sexers in their province this season, Mr. S. I. Brightwell and Mr. J. H. Prosser, both of whom now hold a certificate from the Department.

APPLICATIONS (to be submitted on P.S.C. Form 17A, obtainable at principal Post Offices) with COPIES ONLY of testimonials, will be received up to noon on 14th AUGUST, 1945, for the positions of POULTRY INSTRUCTORS, Permanent Staff, in the DEPARTMENT OF AGRICULTURE at various centres. Commencing salaries up to £380 per annum plus Cost of Living Allowance.

It is desired that applicants should have a good practical knowledge and experience of modern commercial poultry farming, have ability to impart knowledge and give advice on all aspects of poultry keeping by way of demonstrations and lectures, and be able to write informative articles on any subject relative to the business of poultry farming. Military status should be clearly stated. The successful applicant will be required to bear any expenses incurred in travelling to take up appointment.

Sandy Lodge Poultry Farm

offers the finest quality day-old chicks with a guarantee of 95% sexing accuracy; every chick from a first-grade heavy layer.

Pullets at 2/6 each; 25 for £3; 50 for £5/15/-; 100 for £10. Unsexed chicks at half these prices. Delivery from 1st June to mid-October.

E. J. HANKIN,
SANDY LODGE POULTRY FARM,
FOXTON.

New Zealand Federation of Young Farmers' Clubs

ELEVENTH ANNUAL REPORT

The eleventh annual report of the New Zealand Federation of Young Farmers' Clubs (Inc.) was presented at the annual general meeting held at Hamilton on Monday and Tuesday, June 25 and 26, 1945, by the Dominion President, Mr. T. E. Streeter.

I HAVE pleasure in presenting to you the eleventh annual report of the New Zealand Federation of Young Farmers' Clubs. The year under review has been one of momentous happenings, culminating in the recent victory and peace in Europe. We have now to turn our thoughts and actions towards the serious problems of final victory against Japan and, of equal importance, the feeding of the starving millions in Europe. We realise that the struggle against Japan will be terrible, but we are confident that, with our ever-growing strength and that of our Allies the result is certain and victory only a matter of time. We are truly thankful for the termination of the war in Europe, and are looking forward to that day when our arms shall finally prevail against the forces of evil, and peace shall reign once more throughout the world. Peace will bring its problems, but if we face them with the same determination and fortitude with which we have undertaken and prosecuted our war efforts, then we shall find ultimate [illegible] and then, and only then, can we declare that our comrades have not fought and died in vain.

Position of Clubs

A year ago I drew your attention to the very evident movements in the direction of recovery that were taking place in our own organisation. I expressed the hope that during the year every unit of the Y.F.C. Federation would do its best to ensure a speedy and complete re-establishment of our movement throughout the Dominion. I appealed to all members past and present to do their utmost to assist us in the revival of our organisation, reminding them that they should be proud of their Y.F.C. movement, and of the fact that they had still the foundations and the framework on which to rebuild. I am happy to be able to say that my appeal was not in vain. While perhaps to an outsider our activities may not appear to have shown any very marked increase we are ourselves aware very definitely that our movement is now well on the high-road to recovery. During the past year we have increased the number of active clubs from 72 to 104, and the memberships of individual clubs have been added to considerably. This is indeed gratifying, and more so, perhaps, when it is realised that there is today, throughout our organisation, a greater proportionate number of younger members than ever before. It is also of particular significance to note that, with clubs resuming their operations after a long period of recess, their memberships are, in nearly all cases, greater than before the war. The following table indicates the position of the clubs throughout the Dominion:—

	Pre-war.	July, 1943.	July, 1944.	Present date.
Otago-Southland ..	35	12	14	25
Canterbury ..	38	17	21	27
Wellington ..	77	18	18	29
Auckland	53	15	19	23
	203	62	72	104

Only one club has found it necessary to cease operations during the year, but was a club formed the previous year in a district high school, more or less as a junior branch of a well-established club. While it is regrettable that this club was unable to carry on successfully, there is consolation in the fact that the majority of the members have been absorbed by the adjacent club. There are now 12 of these junior clubs established in secondary, technical and high schools, with memberships ranging from [illegible]. In every case these clubs are doing good work, and are a splendid recruiting ground for senior membership of the more senior clubs. A club is also being carried on successfully through the Correspondence Branch of the Education Department.

The [illegible] overseas clubs throughout the Islands of the Pacific were disbanded with the return of the troops from those areas. There are, however, three clubs still functioning in Air Force units in the Pacific, and a very fine club among the troops at [illegible]. In the Middle East a number of clubs are active at various times, and there are [illegible] clubs at the base camps [illegible] where the personnel is of a more permanent nature. Recently a club was formed on a troopship returning from the Middle East. There are also three clubs in operation at Air Force stations within New Zealand. This is a very definite indication of the regard and esteem in which our Y.F.C. movement is held by our comrades in the Armed Forces, and shows to what an extent it has become a part of their lives.

During the year a number of our members have returned to New Zealand, and are joining up again with their old clubs. The [illegible] are returning will, doubtless, be increasing rapidly in the near future.

We feel now more than ever that our efforts to keep the Y.F.C. movement alive have been fully justified, and we must work wholeheartedly to ensure that our boys, and indeed all those of our organisation who are of the [illegible] class in the repatriated class. They have endured so much for us, and it is our bounden duty to assist them in every possible way. We are emerging from the war as a country practically unscathed, and we should be in a position to help our countrymen who have been fighting for us, and at the same time be prepared to increase our production so that we can assist in supplying the much-needed foodstuffs to the rest of the world.

Two-fold Duty

Our main endeavour at this stage should be to push the reconstruction and extension of our Y.F.C. movement. We must remember that we have a two-fold duty before us, first, to our returned members and to rehabilitated soldiers on the land, and second to the younger generation growing up among us. We have as an organisation the definite task of providing [illegible] the greatest possible interest in farming. The livelihood of a nation depends on the land, and we must do all within our power to see to it that our industry prospers. We [illegible] problems that will await us in the future, and some of which are already presenting themselves. To do this we must be prepared to make individual sacrifices and accept our responsibilities as young farmers and as New Zealanders. We have it in our power to extend the scope of better farming conditions and increased production—and I may add that such ideas and ideals can be better formulated and implemented from within the farming community than from without.

Members returning from overseas are already proving a source of strength to our movement. Rehabilitated soldiers on the land are [illegible]. The younger members of the farming community are realising the [illegible]. All clubs should ensure that [illegible] so that their programme of work can

. . . . farming
has a business side

Realising this, The Farm Accounting Association of N.Z. (Inc.), which has Branches at most main centres throughout the South Island and which handles some thousands of farmers' taxation returns and balance-sheets, evolved

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(and particularly young farmers)

This Course is a comprehensive one and covers the principles of business knowledge, farm finance, bookkeeping, legal and other problems which confront the farmer.

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HEAD OFFICE BOX 663, DUNEDIN.

cater for all—not only with the idea of holding them as members, but in a genuine endeavour to be of use to them all—and so make **them** of use to the Y.F.C. movement and to their country. Lectures, demonstrations, and field days should be of a type and nature introducing the practical side of farming. The aim at meetings should be to provide all members with the means whereby they can meet and discuss their own problems and their future aims with those of their own age and ambitions. It is more than ever necessary to ensure that activities, and particularly those of a competitive nature, are undertaken in both junior and senior classes, in an endeavour to improve the knowledge and hold the interest of both the older and the younger members.

Our difficulties at the present time are very real, but they must be faced. Transport still presents one of our major problems—there are still many anomalies in regard to petrol licences and permits, and members attending district meetings and field days still find it hard to arrange transport. The old saying, however, "Where there's a will there's a way" still holds good, and many of our club officials and members are to be congratulated on their ingenuity.

As the movement becomes stronger by the revival of more of the clubs that have been for so long in recess, it is found that the enthusiasm generally waxes greater. There are still some areas in parts of the Dominion where practically no revival has as yet taken place; these areas are a grave problem and call for very intensive organisation. In many districts, however, an almost complete revival has taken place during the past year, most of the old clubs being now re-established, and in some cases new ones formed; and, what is most important, the District Committees are functioning actively once again.

District Committees' Value

The important part that the District Committees play in the welfare of our organisation cannot be too strongly emphasised. They represent the link between the clubs and the parent organisation, and comprised as they are mainly of delegates from the individual clubs as units, they act as the voice of the members themselves in making known their demands and ideas, through their councils, to the federation. In turn they are able to co-ordinate the work of the parent body and assist in implementing its aims and ideals. It has been particularly noticeable during the war that where the District Committees remained active and assumed their responsibilities the movement is strongest today.

Many of the District Committees have been able to hold field days on an inter-club basis during the year, and in most cases these have been responsible for the resuscitation of clubs within their areas. These field days have taken the form of stock demonstrations, etc., and in some cases visits have been made to freezing works, woollen mills, and agricultural colleges. Stock-judging competitions and debating contests have been carried on throughout in a few of the districts, and in others they have been successfully revived during the past year. Activities of this nature have, of course, been limited by the transport available, but they have been carried out successfully and have proved of great value. Clubs are also paying more attention to field days in an endeavour to foster greater interest in their activities. Despite the difficulty in obtaining the services of outside lecturers, clubs have made their programmes attractive, and by drawing on farmers and others within their own districts have gained much valuable information and interest. Discussions, short talks, impromptu speeches, and debates have been encouraged in the clubs, the officials of which have shown great resource in overcoming the handicaps resulting from war conditions.

Department's Assistance

That the organisation created by the Department of Agriculture for the Y.F.C. movement has been responsible in the past for much of the success of the movement was brought home to us of recent years. War conditions and the extra duties imposed upon the department's instructors who had been acting as district secretaries meant that many of them were able to devote little time to Y.F.C. work; in some cases their assistance was entirely withdrawn. While many other factors, such as depletion of membership by overseas enlistments, combined to make it extremely difficult for many of the clubs to remain active—and in some cases were directly responsible for them closing down—there can be no doubt that the support of the department's officers in the past has been of such great assistance that their withdrawal from Y.F.C. work had a very serious effect on the movement. Possibly some of the units, and perhaps some of the District Committees, had come to rely too much upon departmental assistance. Many of the clubs were being "spoon-fed" and will doubtless ultimately profit by having been thrown upon their own resources. The department is now, however, in a position where it is better able to give support. This has been gradually becoming evident during the past few months; indeed in more than one instance the resumption of duty by the local instructor has already resulted in the re-organisation of the District Committee, followed by the revival of a number of clubs. While we recognise and appreciate the difficulties under which the department is labouring at the present time in regard to staff, we are eagerly awaiting the time when, in every district in New Zealand, there will be adequate facilities for the intensive and extensive organisation of our movement. The assistance so capably rendered by the department in the past has been of mutual benefit, and we are looking forward again to further co-operation, without which the undertaking of so many of our activities would be impossible. We feel, too, that our movement provides a splendid and a natural avenue for the dissemination of much of the extension work of the department; for this reason, above all, we are anxious to work with the full support of the whole of the Fields Division and of other divisions of the department.

Over the past two seasons Mr. S. Freeman, the Dominion Organising Secretary, has been acting as secretary to the Wellington Council, and to a number of District Committees also. This has helped the position considerably, and has enabled the work to be carried on in practically a normal manner in those areas. With the gradual revival of the movement throughout the Dominion it has become increasingly difficult for Mr. Freeman to carry on with these extra duties, and I am pleased to say that he has lately been relieved of most of them, and will, in the near future, be in a position to concentrate entirely on the federation's work of organisation in both the North and South Islands.

The Dominion Executive Committee has met three times during the period: in Wellington on October 20; in Christchurch on April 19; and for a short meeting here in Hamilton this morning. These meetings were well attended, and except at the October meeting all four councils were well represented; in October the Otago-Southland delegates were unable to secure ferry berths. During the year I have made contacts with various districts and have attended a number of council meetings, including lately the annual meetings of all four. I was also able to deliver radio talks in the special Y.F.C. sessions from Stations 1YA, Auckland, and 2ZA, Palmerston North. The council meetings at which I was present were well attended, and were responsible for some very good work being carried out.

This report would not be complete without a tribute to those of our members who have served, and are serving, overseas. We are proud of them for what they have done, and for what they have endured, in the cause of freedom. Many of them will not return; to their relatives we extend our deepest sympathy. I am sure that every one of you will feel that we can offer no finer memorial to their sacrifice than to rebuild and extend the Young Farmers' Clubs movement. We have a duty to those who are returning, and we must do all that we can to assist them back to their normal lives.

Acknowledgments

I wish to thank the Minister of Agriculture (the Hon. B. Roberts) for his interest and assistance during the past year. I thank the officers of the Department of Agriculture, who have assisted us under most difficult circumstances. I thank Mr. J. M. Smith, the present Director, and Mr. P. W. Smallfield, the past Director of the Fields Division, for their encouragement, assistance, and active sympathy. I thank the New Zealand Farmers' Union, the A. and P. societies, breed societies, agricultural colleges, and research institutes for their help and encouragement. I also thank the Women's Division of the Farmers' Union and all other bodies and individuals who have assisted our movement during the past year.

I also wish to extend my personal thanks to both Mr. Avery, our Dominion Vice-president, and Mr. D. S. Ross, our Immediate Past President, for the work that they have done, particularly in the North Island, and for their assistance and co-operation. Mr. Avery, as chairman of the Wellington Council, is deserving of further praise for his efforts in the re-establishment of the movement within that area; he is also worthy of special thanks for his capable representation of the Y.F.C. Federation at the Education Conference held at Christchurch last October, and for the comprehensive report of the proceedings that he submitted to the Dominion Executive Committee. Mr. Ross has also represented the federation on the National Council of Primary Production, and, as well as proving a very able delegate, he has contributed much of value to the deliberations of that body. Thanks are also due to Messrs. F. S. Atchison, R. W. Wightman, and A. S. Trotter, the respective chairmen of the Auckland, Canterbury, and Otago-Southland Councils, for their efforts, which have resulted in further progress in those areas. Mr. Jas. Barclay, as the federation's representative on the Dominion Executive of the New Zealand Farmers' Union, is also deserving of praise and thanks. To Mr. S. R. Whyte, who has done such good work as hon. secretary to the Otago-Southland Council, I also give my personal thanks for his untiring efforts on behalf of the movement. I especially thank our Dominion Organising Secretary, Mr. S. Freeman, for his assistance during the period that I have held office; his keenness and enthusiasm are bound up in the progress of the Y.F.C. organisation, and with the additional duties that he has carried out his efforts are all the more valued.

I wish to make a further appeal to all those associated with our movement. We have a great deal upon which to congratulate ourselves when we review the record of the past year, and indeed of the whole of the war period. We entered the war with a strong organisation—203 clubs and an active membership of over 6,000. We lost ground considerably in the early years of the war, the number of clubs sinking as low as 62. We are now definitely "on the up-grade," with 104 clubs. Our movement has proved its value before the war, and it has demonstrated its capabilities during the greatest trial the world has ever before faced and endured. Our movement has a part to play in post-war reconstruction, and we must prepare and plan accordingly. I would ask every one of you to do your utmost to ensure the progress of the Y.F.C. movement. We should not rest content with even the complete restoration of our organisation to what it was before the war; we should strive to extend our movement to embrace every farming district of the Dominion, and to enroll in our membership every available young man in the farming community. We must cultivate a greater appreciation of our heritage, the soil; and in the peacetime that is to come we must plan in the direction of better living and higher ideals, and so do our part in the endeavour to make another war impossible.

(Signed) T. E. STREETER,
Dominion President, N.Z. Federation of Young Farmers' Clubs (Inc.).

Kaukapakapa Club Field Day

(By R. E. V. Seaman, Hon. Secretary, Kaukapakapa Y.F.C.)

THE Kaukapakapa Young Farmers' Club held a very successful field day recently at "Braefields," the farm of Messrs. H. A. and J. B. Hooper. Although at first the weather was unsettled, visitors came from as far afield as Port Albert and Warkworth, and an attendance of 63 ensured the day's success.

The president welcomed the visitors on behalf of the club, and introduced the first speaker, Mr. S. J. Sheaf, manager of the Auckland Herd Improvement Association. Mr. Sheaf had addressed meetings of Young Farmers' Clubs in the Waikato before the war, and expressed the hope that those clubs in recess would be resuscitated in the near future. He spoke of the labour problems of herd testing, and stressed the valuable work done by lady testing officers, without whom the association would have been forced to curtail its activities. However, the association had been able to carry on, and in sire survey work had been able to give even better service to its members. He stressed that the herd sire was the main hope of raising the Dominion herd average. A list of proven bulls is given annually in the herd testing report, which should be a valuable guide to those wishing to purchase bulls of a proven strain.

Artificial insemination had been another section of the association's activities, and Mr. Sheaf explained how his association had collaborated with the Ruakura Animal Research Station.

Mr. J. B. Hooper gave facts and figures to show that the farmer cannot afford **not** to test. A survey of his own herd, taking the highest and the lowest cows, with the same number of days over a period of 11 years, revealed that the total difference of butterfat was nearly 2,000lb., which, at 1/- per lb., represented a loss of £100 had these cows not been culled at the end of each season.

Mr. Sheffield, of Helensville, demonstrated the methods used by farmers in inseminating their own cows with semen and apparatus supplied by Ruakura.

Mr. G. Worker, of Wellsford, gave an interesting demonstration on how to judge Jersey cows, remarking that "Most people can recognise lack of type, but not so many can tell what is deficient, and that is the purpose of a demonstration." After his demonstration his audience had a much better conception of type. In all 21 cattle were penned or tied up, and the scene resembled a show. The field day was completed by a review of the remainder of the herd.

Afternoon tea was provided by Mrs. J. B. Hooper, assisted by Mrs. W. Williamson. Mr. J. Reed, of Port Albert, thanked Mr. Hooper on behalf of the visitors, and complimented him on his fine achievement. The president then thanked all those who had assisted in the field day, especially Mr. Sheaf, the demonstrators, and Mrs. J. B. Hooper for her hospitality.

Y.F.C. on Returning Troopship

AMONG the activities on board the ship bringing the South Island replacement draft home recently there was a very successfully run Young Farmers' Club under the direction of Sgt. Norman Mahon, a member of the Scargill-Omihi Y.F.C., and of the Lowry Hut Farmers' Association, a group formed in the 2nd N.Z.E.F. Base in the Middle East.

Quite a number of farming specialists were discovered on board. and lectures were given on Clydesdales, poultry, wool, lucerne, artificial insemination, grasslands in India, farming in Scotland and in Palestine, as well as "Points in Picking a Farm."

The enthusiasm and energy of Sgt. Mahon made the group a great success, attendances at meetings being usually over 50. Sgt. Mahon was greatly assisted by members of the committee, Major Anderson and Cpls. Fallow and Martin. Much use was made of text books and pamphlets supplied by E.R.S., and also, in conjunction with this group, a Farm Bookkeeping class was held, which was attended by many of the members.

OBITUARY

SQUADRON LEADER E. W. BARNETT, A.F.C.

Y.F.C. members in the Dominion will have learnt with regret of the passing of Squadron Leader E. W. Barnett, whose death occurred at Palmerston North on June 11 after a long illness.

"Barney," as he was popularly known, was a foundation member of the Halcombe Young Farmers' Club, and became chairman of the Manawatu Y.F.C. District Committee, and later chairman of the Wellington Council. Just prior to the war he was elected Dominion President of the Federation, which office he filled capably for two years. At the outbreak of war he enlisted and was accepted in the R.N.Z.A.F. as a flying instructor. He attained the rank of Squadron Leader, and was awarded the Air Force Cross.

Barney was well known in farming circles as a breeder of Southdown sheep and Polled Hereford cattle. He was keenly interested in the Y.F.C. movement even after he had joined the Air Force, and he went out of his way to assist wherever possible. He was active in many other organisations, being a member of the council of the Royal Agricultural Society of N.Z., and also chairman of the Western District Council of that organisation. He was also a member of the council of the N.Z. Hereford Cattle Breeders' Association. He held office as vice-president of the Manawatu A. and P. Association and the Marton A. and P. Association, and was a member of the committee of the Feilding A. and P. Association. He was connected also with the Wellington Acclimatisation Society, the Manawatu and Oroua School Committees' Association, and the Oroua Rabbit Board. Until his enlistment he was a member of the National Council of Primary Production. Prior to the war he took an active part in civil aviation, and on his enlistment he had 175 flying hours to his credit.

Barney was a promising young leader of the rural community, and in losing him young farmers throughout New Zealand will feel they have lost a "great chap" and a true friend. The deepest sympathies of all units and members of the Y.F.C. organisation are extended to his family and relatives.

A scene at the Kaukapakapa field day.

Wanganui District Stock Judging

THE Wanganui Y.F.C. District Committee held a field day recently in the Domain at Taihape. It was devoted to stock-judging and demonstrations on the following classes: Southdowns, Romneys, dairy cattle, pigs, and beef cattle. The competition was open to teams of five members, each to judge one class only, clubs being allowed to enter any number of separate teams in both the junior and senior classes.

The fixture unfortunately clashed with a Y.F.C. dog trial class at Taihape, and the local club was unable to raise a team. The bad weather, together with transport difficulties, made it impossible for some of the other clubs to send members, and the competition finally resolved itself into a contest between four senior teams (two each from the Mangaweka and Marton Clubs); a team from Mangaweka was the only entry in the junior competition. Considering the weather, however, the attendance was good, there being approximately 50 members and visitors present. The senior trophy was won by the Marton (A) team, and the Mangaweka junior team gained the junior trophy without opposition.

The individual results in the various classes were as follows (maximum 180 points):—

Southdowns:—

Senior: L. Vile, Marton (A), 163 points, 1; G. Lampp, Marton (B), 100 points, 2; J. Robinson, Mangaweka (B), 72 points, 3; K. Green, Mangaweka (A), 63 points, 4.

Junior: C. Toms, Mangaweka, 48 points.

Romneys:—

Senior: L. McKinnon, Mangaweka (B), 111 points, 1; M. Gardner, Mangaweka (A), 87 points, 2; M. Marshall, Marton (A), 67 points, 3; M. F. Gray, Marton (B), 50 points, 4.

Junior: R. J. Thomasen, Mangaweka, 72 points.

Dairy Cattle:—

Senior: K. G. Coles, Marton (A), 165 points, 1; G. Gordon, Marton (B), 155 points, 2; J. R. Dalrymple, Mangaweka (B), 110 points, 3; D. Murphy, Mangaweka (A), 50 points, 4.

Junior: M. Perry, Mangaweka, 150 points.

Pigs:—

Senior: H. Millar, Marton (A), 171 points, 1; A. Dickey, Marton (B), and B. Rowley, Mangaweka (A), 170 points, equal 2; T. Green, Mangaweka (B), 145 points, 4.

Junior: E. Daphne, Mangaweka, 160 points.

Beef Cattle:—

Senior: J. Lampp, Marton (B), 148 points, 1; P. Green, Mangaweka (B), 128 points, 2; N. Weston, Mangaweka (A), 124 points, 3; M. Marshall, Marton (A), 118 points, 4.

Junior: A. R. Ross, Mangaweka, 86 points.

Points for Teams:—

Senior: Marton (A) 684 points; Marton (B) 623; Mangaweka (B) 566; Mangaweka (A) 494.

Junior: Mangaweka, 516 points.

The judges and demonstrators for the various classes were as follows:—

Southdowns: Mr. D. K. Coleman, Taihape.
Romneys: Mr. A. L. Wheeler, Leedstown.
Dairy cattle: Mr. C. J. Masters, Wanganui.
Pigs: Mr. K. G. Coles, Marton.
Beef cattle: Mr. L. A. P. Sheriff, Taihape.

The arrangements for the field day were in the hands of a committee from the Mangaweka and Taihape Clubs, with Mr. B. J. Collerton, Taihape Y.F.C., as chairman. The Dominion Organising Secretary, Mr. S. Freeman, was present.

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Reports on Club Activities

WESTERN SOUTHLAND

Lochiel.—This club has just been revived after being in recess for over three years. Officers elected: Advisory president, Mr. A. Diack; chairman, W. May; secretary, S. Moynihan; treasurer, I. Fleming. The club has started with a membership of 16, and it appears to have good prospects of increasing this number.

Orepuki.—Debate to be held between the club and the Farmers' Union; to be followed by a dance. Club debate on the subject "That agriculture offers as good an opportunity to young men in New Zealand as does any other employment." The affirmative were given the award after a very interesting debate, the decision being a close one. Seventeen members present out of a total of 35.

Tokanui.—This is an entirely new club, formed recently with an initial membership of 15. Officers elected: Advisory president, Mr. T. A. Buckingham; chairman, M. Ericson; secretary, D. Hurle; treasurer, T. Ruddenklau. This club seems to have very good prospects of success.

EASTERN SOUTHLAND

Maitland.—This club has recently been revived after a period of well over three years in recess. Officers elected: Advisory president, Mr. Jas. Johnston; chairman, B. Johnston; vice-chairman, J. Y. Smail; secretary, H. J. Thayer. The club has begun with a membership of 11, and intends to hold a field day in the near future, and to organise a dog trial.

SOUTH OTAGO

Milton.—Annual meeting. Officers elected: Advisory president, Mr. A. B. Stewart; chairman, A. T. Allison; vice-chairman, D. J. Allison; secretary, G. E. Cullen; advisory members, Messrs. C. R. Sheet, A. Tweed, V. R. Clark. Arrangements for a dance. Short lecture by R. Stewart, who described his activities in the Pacific Islands. Eleven members present out of a total of 51.

DUNEDIN

West Taieri.—Talk by Mr. L. Harvey on "How to Conduct a Meeting"; this proved most interesting and was much appreciated. Seven members present out of 15.

SOUTH CANTERBURY

Pleasant Point.—Final arrangements for annual ball. Lecture by Mr. D. S. Loder on "World Affairs"; this proved very interesting and instructive. Twenty-six members present out of 35. Officers elected at the annual meeting: Advisory president, Mr. V. Wilson; chairman, J. W. Crombie; secretary, E. L. Esler; treasurer, S. W. Davey. Twenty-three members attended the annual meeting.

MID-CANTERBURY

Ashburton D.H.S.—Field day at the Canterbury Roller Flour Mills. Mr. D. Moore, of the company's staff, showed the party round, and described the complete process from wheat to the processed flour, showing the various stages in manufacture and the removal of impurities. Fourteen members attended.

Hinds.—Team selected to represent club in the inter-club debate, W. Taylor, R. Cocks, and K. McConnell. The chairman reported on the annual meeting of the District Committee. One new member enrolled. Fourteen present out of 19.

Methven.—Two new members enrolled. Preliminary arrangements for annual ball. Report on annual meeting of district committee by F. McKay. A "mock meeting" was held with C. Norton acting as chairman and B. Campbell as secretary. Twenty-three present out of 78. At the previous meeting the winners of stock-judging competition held at Methven Show were announced as follows:—J. Oldfield, 1; A. W. McKay, 2; S. A. Grigg, 3; B. Anderson, 4; W. Stevens, 5. Short talks by members on subjects of farming interest. Twenty-eight members present.

CHRISTCHURCH

Darfield.—Five new members enrolled. Debate with Ellesmere Club; subject, "That the Average Standard of Farming in Canterbury is Poor." Speakers, A. S. Ford, B. K. Wagner, A. Anderson (Ellesmere); J. Stewart, A. Mulholland, J. Duncan (Darfield). Ellesmere gained the award by 280 points to 267. Mr. D. O'Connell acted as judge. Seventeen members present out of 35. Officers elected at the annual meeting: Advisory members, Messrs. C. O. Redfern and R. S. Gunn; chairman, B. E. Jarman; secretary and treasurer, M. R. Black. Twelve members present.

Ellesmere.—One new member elected. Team selected to debate with Darfield Club. Arrangements for dance. Address by Mr. Colin How, consulting officer, N.Z. Dairy Board, on "Mastitis in Cows." There were 26 members present.

NORTH CANTERBURY

Amberley.—Discussion on changing name of club to "Kowai"; decided to discuss matter with district secretary. Talks by members as follows: A. H. Topp ("Bokhara Clover"); K. Henderson ("Phalaris Grass"); and F. Wilson ("Lotus Major"). Eight present out of 18.

Cheviot.—This club has been recently revived after having been in recess for nearly two years. Officers elected: Advisory president, Mr. R. S. Morrison; chairman, H. M. Cooper; secretary, R. M. Stevenson; treasurer, C. C. Grey. Seventeen members present at initial meeting.

Oxford.—Annual meeting. Officers elected: Advisory president, Mr. J. E. H. McGrath; chairman, T. H. Thompson; secretary, L. Irwin; treasurer, R. Reed. Fourteen members present.

MARLBOROUGH

Flaxbourne.—Discussion in regard to formation of a district committee for Marlborough. Local R.S.A. to be challenged to a debate. Each member present spoke for two minutes on the junior subject selected for a debate, "That the Horse will survive the Tractor." At previously unreported meetings the advisory president, Mr. W. S. Morrin, gave a talk on "Land Tenure," enumerating the various types and explaining their titles. Two-minutes speeches were given by all members on the subject "That the Plough is Obsolete," with a view to the selection of two teams to debate against Seddon Y.F.C. The attendances at these meetings varied from 12 to 20 out of a total of 28 members. Dog trials were held by the club, and proved very successful, a profit of £10 being gained. Entry was open to the public. Three prizes were given in each event, namely "Head and Hold in Ring" (27 entries), and "Huntaway" (23 entries). In addition three special prizes were awarded to Y.F.C. members. An entry fee of five shillings was charged, and the two events filled in the day comfortably. Donations totalled £16.

Seddon.—Annual meeting. Officers elected: Advisory president, Mr. W. Kington, chairman, H. Gluyas; secretary and treasurer, L. J. Marfell. Nine members present.

NELSON

Dovedale.—Annual meeting. Officers elected: Advisory members, Messrs. I. Win and P. J. Burnett; chairman, R. T. Hawkes; secretary and treasurer, R. E. Burnett. Twelve members present.

Maruia.—Annual meeting. Officers elected: Advisory president, Mr. R. C. Gibbs; chairman, F. J. Douglas; secretary and treasurer, J. D. Gibbs. Seventeen members attended.

HOROWHENUA

Levin.—One new member enrolled. Address by Mr. A. C. Morton, of Massey College, on

"Raising Fat Lambs." Eleven members present out of 24.

MANAWATU

Apiti.—I. Old elected chairman in place of P. R. McKay, who is to go into the Army shortly. Address by Mr. H. H. Jensen on "Trees." Thirteen present out of 35.

Bunnythorpe.—Discussion regarding Roll of Honour Plaque. Dance to be held. Congratulations extended to T. Hyde and J. O'Brien on their broadcast from Station 2ZA, Palmerston North, in the Y.F.C. weekly session. Vote of thanks to Messrs. Donald and Galpin for their assistance in compiling the radio script. Sixteen members attended out of 19.

Kairanga.—Final arrangements for dance. Field day to be held at Longburn Freezing Works. Football team to be selected in near future. Twenty-five members present out of total of 28.

Oroua Downs.—Address by Mr. K. Wyness on his experiences in the Pacific. Twenty-two present out of 27.

Pohangina Valley.—J. Leamy to give a talk over the radio at a future date. J. Dawson to address the next meeting on "Curing Hides." Field day to be held. Debate, "That the Plough is Obsolete"; this was followed by a talk on "Meeting Procedure," by Mr. J. Linklater. Twenty-one present out of 31.

Rongotea.—Mr. W. Wilson gave a very interesting address, outlining his trip to England. He also acquainted members with the acute food shortage in Britain. Twenty-seven members present out of 41. At the previous meeting arrangements were made for a field day at Massey College, and it was decided to organise a football team. A very interesting field day was held at the Longburn Freezing Works, 20 members being present. The tour of the works commenced at 1 p.m., and lasted for two and a half hours. The party was shown over the works by Mr. Wilson, the works manager; the killing of cattle, sheep and pigs was in progress. At the conclusion of the inspection the party was entertained at afternoon tea by the Freezing Co. Mr. Wilson gave a short talk to the members, and then introduced Captain Evans, of the U.S. Army, who gave a brief address on "Farming in the United States." The club also held a very successful dance, the proceeds going to the local patriotic funds.

Whakarongo.—Final arrangements for dance. Club debate, the subject being "That Haybaling is superior to Hay-stacking." Mr. Hall, of Palmerston North Technical School, kindly acted as adjudicator, and gave the award to the negative team. Sixteen members present out of 26.

WANGANUI

Bulls.—Questions to be selected dealing with the club's day of instruction held at Ohakea Air Force Station; these questions to be sent to Ohakea, where an officer and two members of the club would compile a radio script on pilot release to be broadcast in the Y.F.C. session as a discussion. Members to attend a field day at Massey College. At previous meetings arrangements were made for a field day on Mr. Eglinton's property. Football team to be selected to play Ohakea. Addresses by Messrs. E. W. Cowdrey and R. Managh, on "Wheat Growing"; both speakers are practical farmers in the Halcombe district, and grow wheat quite extensively. They were able to pass on much useful knowledge, and both stressed the urgency for more wheat during the coming year. At another unreported meeting teams were selected for the district debating contest; the chairman gave a report on the recent District Committee meeting, and a discussion took place on suggested trials in the Bulls district with Sweet Yellow lupin for the Department of Agriculture. Attendances varied from 9 to 12 members out of a total of 38.

Hunterville.—Field day to be held. P. Rhodes appointed delegate to local branch of Farmers' Union. The chairman presented certificates to members who won events at the recent athletic sports held at Rata. Final arrangements for dance. Debating teams selected to compete in the district contest. Interesting talk by Mr. Lloyd Hammond on the newly-formed Federated Farmers. Sixteen members present. At a previous meeting an interesting talk was given by Mr. Geo. McDonald on "The Disadvantages of the Show Ring." A generous offer was received from Mr. C. J. Craig of a prize to the member who attended the most meetings and who enrolled the most new members. A debate was held between members of the junior W.D.F.U. and the Y.F.C., the subject being, "That Women are Comparatively Better on the Land than Men in the Home." The debate proved a most amusing one. The speakers were Miss G. Boucher (leader), supported by Misses J. Harre and N. Harvey (affirmative), and M. Henwood (leader), J. Bartlett and H. Harvey (negative). Mr. C. J. Craig acted as chairman, and the Rev. A. Baxter, M.A., as adjudicator. After the leaders had summed up, the chairman declared the debate open, and several of the audience took advantage of this to express their views. The adjudicator gave the decision to the affirmative by 67 points to 60, and in his comments gave some very helpful advice to individual speakers. Miss A. Pickard, president of the junior W.D.F.U., and J. Bartlett, chairman of the Hunterville Y.F.C., expressed thanks to the chairman and adjudicator. A combined meeting was then held, at which a committee was set up to arrange a dance.

Mangaweka.—Arrangements for dance. Demonstration by Mr. W. Brown on the "doing up" of a circular saw. Eighteen members present out of 24.

Marton.—Teams selected for district debating contest. Arrangements for annual dance. Suggestions made re supper at meetings, a field day at Massey College, and a dog trial. Working party to clear around the trees planted by the club in Centennial Park. Four new members enrolled. A very comprehensive talk was given by Mr. Lloyd Hammond, of Rata, on "Federated Farmers." The working of the organisation from the farmer right up to the Dominion Council was explained; Mr. Hammond stressed the importance of young farmers taking an active part in this new organisation. There were 22 members present out of 29.

Ohakea.—A very interesting report has been received from the Ohakea Air Force Station Y.F.C., covering the work carried out during the past year, a summary of which follows:—Outside functions: Visits to Plant Research Station, Massey College, Mr. C. Vile's farm, Mr. C. Eglinton's farm, Y.F.C. Field Day at Marton, wool-classing lecture at Massey College, and club dinner given by Bulls Y.F.C. Lectures were given on Southdown sheep, pigs, beekeeping, diseases of stock, land settlement, mole drainage, legal points for the farmer, mastitis, and vegetables. Mr. E. Bruce Levy gave an address on his tour of Europe, illustrated by lantern slides. Club members and others of the Air Force personnel contributed technicolour films of the Canadian Rockies, talks on such subjects as "Farming in Kenya," and "Farm Shelter." A debate was held with the discussion group on the station, the subject being "Collective Farming." Agricultural films supplied by the A.E.W.S. were also an added interest. The club membership varies owing to "postings"; the present membership is 15.

Waimarino.—This club has just been revived after being in recess for a considerable time. Further news will be available in next month's issue.

WAIRARAPA

Carterton.—Arrangements for annual dance. Introduction of new district secretary, Mr. G. S. Robinson. Talk by Mr. Robinson on his experiences in England while on loan from New Zealand to the British Ministry of Agriculture. Ten present out of 35.

Masterton.—Arrangements for a dance. Social to be held in honour of returned members. Address by J. Pointon, a returned club member, on "D" Day. Thirty-seven members present out of 60. At a previous meeting a lecture on "Dog Trials" was given by Mr. H. McGuiness.

Lecture Brevities

FEDERATED FARMERS

A FEW of the reasons why it had been necessary to form Federated Farmers were given to the Marton Club by Mr. Lloyd Hammond, Rata. He gave the example of the Sheepowners' Federation and the Farmers' Union holding simultaneous conferences and often passing resolutions diametrically opposed to each other, so about two years ago the suggestion was made to the Farmers' Union and the Sheepowners' Federation that they unite and ask all other sections of primary producers to combine to form a single body. Provisional provincial executives are being formed for the purpose of getting the branches and produce sections going.

The speaker went on to show how the organisation was built up and how the representation was carried from the farmer right up to the Dominion council. The present rules and regulations are only tentative, and are subject to ratification or alteration at the first Dominion conference, which will probably be held early next year or possibly before the end of this one. In the meantime the Farmers' Federation—a sort of combined committee of the Farmers' Union and Sheepowners' Federation and not to be confused with Federated Farmers—will carry on any important business. All those who belong to any of the old organisations are automatically members of Federated Farmers.

Mr. Hammond then stressed the importance of young farmers taking an active part in the new organisation. Farming must be organised, for this is the age of organised industry, and by organisation farming should be able to achieve its aims. Federated Farmers is not party political—it would be disastrous if it were—though it will have to be political, for farming is in the anomalous position of being in a minority, though it produces 95 per cent. of the nation's wealth.

Members were urged not to sit by and say that we had not the ability—that there were plenty of other fellows to do the work. That spirit will not get farming anywhere. Mr. Hammond said that some of the best brains in the Farmers' Union had been men who thought that they had not the ability. The older men had had enough, and were looking to the young farmers especially to supply the new blood urgently needed. "We are looking to the Young Farmers' Clubs to back us up," concluded Mr. Hammond.

—MALCOLM F. GRAY, Hon.
Secretary, Marton Y.F.C.

SOUTHERN HAWKE'S BAY

Dannevirke.—Welcome extended to I. G. Macdonald, an advisory member. K. Tait reported on the annual meeting of the district committee, giving officers elected, list of lecturers drawn up, and details of field day and debating contest arranged. Discussion on field day and debating contest, and arrangements made for the club to take full part in them. Short talks by members as follows: G. Reisma ("Milk Fever"), J. Lowes ("Disinfection and Disinfectants"), H. Allardice ("Internal Parasites in Sheep"), G. Redward ("Making Good Hay"). Mr. R. G. MacDonald spoke on "Horses" as the main talk of the evening. He outlined the points of a good draught, a hack, a cob, and a Shetland pony, explaining their different uses and giving a practical reason for each point. His talk was very interesting and occasioned many questions. The club's best wishes were extended by the chairman to V. C. Cammock, who is shortly joining the Air Force. Attendance of 40 members, out of a total of 47.

NORTHERN HAWKE'S BAY

Meeanee.—Arrangements for annual district sports. Informal talks by members. Nine present out of 22.

Wairoa.—Annual meeting. Officers elected: Advisory president, Mr. H. Bayley; chairman, E. Brownlie; secretary, I. J. Bell; treasurer, F. Lister. Twenty-one members attended.

TE KUITI

Te Anga Central.—Interesting talk by Mr. G. A. Burt, advisory president, on "Judging at Dog Trials." Fifteen present out of 18.

WAIKATO

Cambridge.—Lecture by Mr. W. Sage on "Beekeeping." Fourteen members present out of 35. At the previous meeting arrangements made for a field day; report given on recent dance. Talk by T. Moore, a club member, on the Farm School held recently at Claudelands. Seventeen present.

Okoroire.—Preparations for a dance. Arrangements made for members requiring books from the Adult Education scheme to obtain them through the club. An enjoyable card evening was held, in the absence of the lecturer for the evening. Twenty members present out of 41.

Te Awamutu.—Field day held on Mr. Cowie's property, Parawera. Mr. Cowie showed the party around his farm, and spoke and demonstrated on fat lamb raising, fattening beef cattle, and farm management generally. Ten members of the club were present.

BAY OF PLENTY

Kati Kati.—Dance to be held in near future. Mr. Bayliss coached members in debating as a team. At the previous meeting Mr. A. V. Allo, Department of Agriculture, gave an address on "Pampas Grass." Ten members at both meetings, out of total of 29.

Omokoroa.—Four entries for the ensilage competition. Team to be entered for the first round of the district debating contest. Concert to be held to raise funds for the Y.F.C. Memorial Scheme. Four new members enrolled. Eighteen present out of 22.

Waimana.—Lecture by Mr. Barwell, Supervisor, Pig Council, Bay of Plenty, on "Pig Husbandry." Ten members present out of 20.

AUCKLAND

Clevedon.—Report on dance held in conjunction with Clevedon W.D.F.U.; the club's share of the profits amounted to £13 4s. 2d. Lecture by Mr. P. Martin Smith on "Reconstruction and the Rural Areas." Twelve present out of 21.

East Tamaki.—Report by J. Valder on recent district committee meeting at Drury. Entries for inter-club stock-judging at Pukekohe; eight competitors selected, two each to compete in the cattle, horse, sheep, and pig classes. An article on "Mole Drainage" in the "New Zealand Journal of Agriculture," was read and general discussion took place on this subject. Twenty-two members present out of a total of 31.

Franklin.—Report on dance held at Ranuhama, which netted a profit of £9 10s. Report on the combined field day held at Pukekohe Show Grounds, run by the district committee; Franklin club came second on points in the stock-judging competition—horses, cattle, sheep, and pigs. Lecture by Dr. W. S. Hill on "Grass and Clover Species and their Values." The speaker explained the characteristics of the different grasses and clovers, and which species to grow in the various types of soil and climate, and also for the different seasonal requirements. After his lecture, Dr. Hill answered numerous questions on general farm topics. Twenty-two present out of 29.

Harrisville.—Arrangements for future lectures, etc. Address by Mr. F. S. Atchison, chairman of the Auckland Y.F.C. Council, on "The Working of the Y.F.C. Movement." Six members present out of 16.

Collection of Bobby Calves

WITH the approach of the season for the collection of bobby calves, the following extracts from the Calves (Sales for Slaughter) Regulations, 1936, are published for the information of farmers and transport operators.

No person, whether as principal or agent, shall sell or offer for sale any bobby calf unless such calf has been properly and sufficiently fed daily from birth and has been so fed not earlier than four hours before the time of its actual removal from his premises in pursuance of a sale or a contract or intended contract of sale.

In any proceedings brought against any person for failing properly and sufficiently to feed any calf the burden of proof that such calf has been fed as required by these regulations shall lie on the defendant.

No person, whether as principal or agent, shall purchase, drive, or convey any calf which appears to be unfit by reason of weakness or immaturity to be driven or conveyed to the place at which it is intended to be slaughtered for human consumption.

Every person who commits a breach of these regulations shall be liable to a fine of £5.

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THE GOOD NEIGHBOUR

"Where Poppies Blow"

"Poppies dancing by the wall,
Vivid flame against the white;
Swaying, bending, bowing low,
Tossing high each crimson head,
As they flaunt their frocks of red
Double-frilled and ragged edged."

THE poppy is the flower of sleep. In ancient mythology Somnus, the god of sleep, is pictured as wearing night-black robes studded with golden stars, and a crown of poppies. Outside the cavern

"Nodding poppies grow,
And all cool simples that sweet rest bestow;
Night from the plants their sleepy virtue drains,
And passing, sheds it on the silent plains;"

and the shadowy wraiths who guard the portals of sleep each carry great sheaves of poppies. Dream-spirits softly murmur pleasing fancies in the ear of the drowsy monarch, the evil genii who cause nightmares being banished to the furthermost end of the cave. Nevertheless, the latter often accompany their more favoured companions on their journeys to the earth. Should they take the ivory gate leading from the valley of Somnus, they become "meaningless and idle, and can never be fulfilled," but if they pass through the "doors of polished horn" they foretell coming events, whether good or ill.

Hence we have the saying, "Pleasant dreams, and sweet repose." For when our rest is disturbed by troublesome dreams it is never so beneficial as peaceful slumber. Therefore it behoves us to do all we can to ensure that our sleep be tranquil. This depends largely on our ability to relax. During the last few years we have had a greater need of relaxation and correspondingly less leisure for recreational purposes. The necessity to "make do and mend" hinders many a housewife from demonstrating her skill at embroidery or keeping abreast of the latest literature from the library. However, we must make the most of the free moments that come our way. Even ten minutes given to music or modelling or whatever is our favourite medium of release from our major occupation will have a recuperative effect on our energies and help us to achieve the ultimate relaxation—sleep.

It was Queen Elizabeth of Roumania who said: "Sleep is a generous thief: he gives to vigour what he takes from time." Even the busiest of us must learn how to relax completely if we are to continue giving of our best to our work. Much of our worrying is due to lack of faith and neglect of the Divine source of all strength. The Canadian poet Virma Sheard has written a lovely little poem which will be specially appreciated by those who have difficulty in sleeping. It is entitled, "At Midnight":

Turn Thou the key upon our thoughts, dear Lord,
And let us sleep;
Give us our portion of forgetfulness
Silent and deep.
Lay Thou Thy quiet hand upon our eyes
To close their sight,
Shut out the shining of the moon and stars
And candlelight.
Keep back the phantoms and the visions sad—
The shades of grey—
The fancies that so haunt the little hours
Before the day.
Quiet the time-worn questions that are all
Unanswered yet;
Take from the spent and troubled souls of us
Their vain regret.
And lead us far into Thy silent land
That we may go
Like children out across the field of dreams
Where poppies blow.
So all Thy saints—and all Thy sinners, too—
Wilt Thou not keep,
Since not alone unto Thy well-beloved
Thou givest sleep?"

I wonder if we in New Zealand are sufficiently thankful for the everyday comforts of sweet slumber—warm blankets, clean linen, a comfortable bed. Those of us whose menfolk have returned from fighting overseas or who have offered hospitality to refugees from war-scarred lands are not likely again to take for granted the items which contribute so much to our nightly comfort. The victory in Europe has brought to millions of people the blessing of quiet nights of sleep. In our rejoicing we must not lose sight of the fact that the building of an enduring peace calls for courage, sacrifice, unity, and unselfish effort—all those qualities by which we are actuated in time of war. The inestimable boon of sleep will help us to do our part. The period we spend each night "where poppies blow" will restore our vigour, counsel our tangled thoughts, solace our sufferings, and so recreate our vision of a new world order that we daily endeavour to translate the ideal into terms of practical reality.

Mary

"When that great day comes...."

And that great day **will come.** When hate is turned to love . . . war to peace . . . and dreams to reality.

And your dreams of plenty will come true, too. The day that you dreamed of Onehunga blankets in your own home is not far distant, for even now Onehunga Mills are releasing a limited supply of their famous products for civilian needs, and your "hope chest" may soon receive its quota of those precious Onehunga Air-Cell or ordinary blankets, whose quality has been so well worth waiting for.

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Carpet and Rug Repair

CARPETS and rugs are both scarce and expensive nowadays, and a wise woman will review her floor coverings frequently, mending at the first sign of wear and renovating the most badly worn articles. Rugs and the smaller carpets will gain a new lease of life when the frayed edges and worn fringes have been dealt with, while many a threadbare and weary-looking carpet has given good service when the better parts have been cut out and joined to make bedside, hearth, or hall rugs.

By EVA TOPPING, *Rural Sociologist, Dept. of Agriculture, Auckland.*

[Photographs reproduced from U.S. Dept. of Agriculture Bulletin No. 1960.]

A STRONG, sharp pair of scissors or a keen knife with a sharp point will be needed for cutting carpets and trimming worn edges. If a razor blade is used, set one side in a large cork to protect the fingers from cuts. Needles should be of the thick, strong variety—heavy darners or the sewing needles usually called "straws" in size 3 or 4. Strong linen thread, in drab or black, is the most suitable to use,, but if unobtainable, crochet cotton in khaki or black, size 10, makes a good substitute. It will be found helpful to draw the thread over a piece of beeswax occasionally while sewing, and to run the needle through your hair—the natural oil from the hair acts like magic on the needle, making it slip through the heavy fabric much more readily. Be sure to use a thimble, or the fingers will become very sore.

Clean the rug thoroughly on both sides with a stiff brush or vacuum cleaner before repairing, but avoid shaking or beating, as this treatment will work out more loose threads and extend the damage. Wash soiled rugs by gently scrubbing with a soft brush and warm soapy water. Use a circular movement and light pressure, rinsing out as much soap as possible by using a second basin of clean, frequently changed water.

If the carpet is too large to lift to a table, sit on a low stool or box with a cushion, place your back against the wall to relieve strain, and work with the rug in your lap. Slip a second small box under a heavy rug to raise it from the floor and to make it easier to get at the damaged place.

Frayed Ends

Carpets and rugs with worn hems frayed edges, or worn-out fringes may be repaired by re-binding or replacing the fringe—carpet binding and fringing may be obtainable in some districts and makes a better job, but strips of sugar-bag, dyed hessian, or firm woollen material can be used and will be quite satisfactory. Felt of the lighter weight usually sold for embroidery makes very successful binding and is easy to manipulate. Cut strips about 3in. wide if the material is inclined to fray (a little less if the cut edges are firm) and of

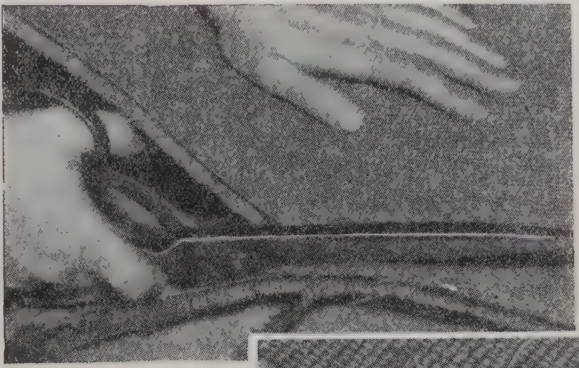

Fig. 1—Cut off frayed end of rug.

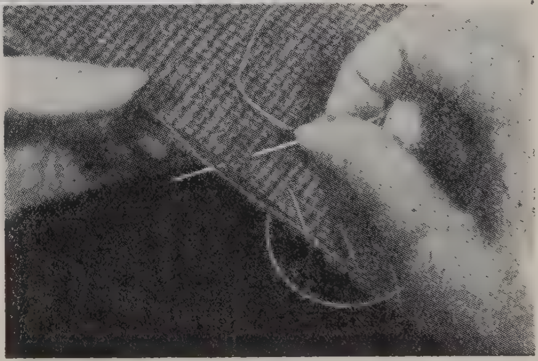

Fig. 2 — Overcast the cut edge of rug.

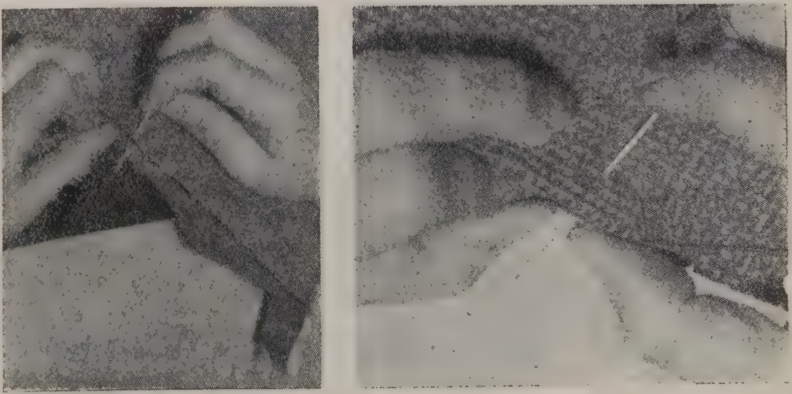

Fig. 3—Sew binding to the cut edge of rug. Close-up of stitch is shown at right.

Don't Speak

When you know nothing about the subject which is on the carpet.
When your neighbour's grief is too heavy even for the gentle rain of words.
When the hounds of scandal are in full cry.
When your enemies accuse you falsely.
The word which will make a man ashamed of himself.
When you are asked for advice, and are not sure.
When the hand of God is heavy upon you.
The word which you cannot seal in the envelope of Love.
A word against another man's faith.

the required length. Whichever type of repair you choose, the first step is to trim off the worn or frayed parts. Start where the damage is worst. Use large scissors or a knife, and cut from wrong side. Follow one of the crosswise or lengthwise yarns or ridges (Fig. 1). Save all good scraps of carpet—you may need them for repairs.

If the rug edge frays badly or you want to strengthen it and make it firmer for finishing, overcast the edge before you sew on binding or put on fringe (Fig. 2). To save time you may omit the overcasting if you trim off only a little of the worn edge at a time and sew on the binding or fringe as you go. But whichever you do, handle the trimmed edge as little as possible.

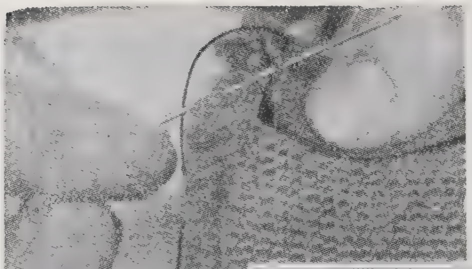
Fig. 4—Sew end of binding to carpet.

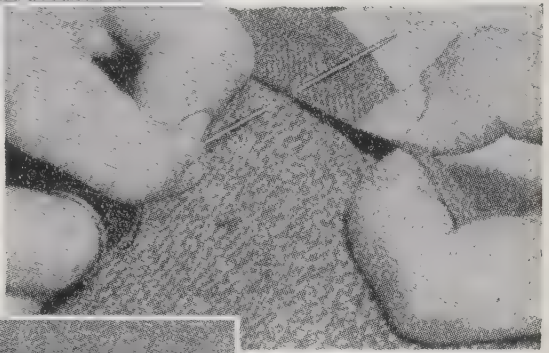
Fig. 5—Sew binding to back of carpet.

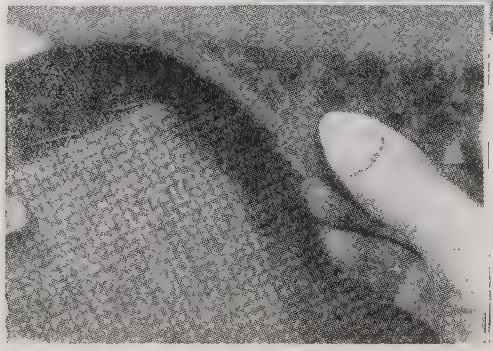
Fig. 6—Finished binding has a narrow edge on the right side of rug. On the wrong side a wider band protects the carpet.

Binding

Lay the right side of the binding on the right side of the carpet, the edge of the binding even with the trimmed edge of the carpet. Allow 1½in. of binding to turn under at each end. For sewing on binding use a heavy darning needle and carpet thread. Fasten the thread at the rug selvedge with a few short stitches, one on top of the other. From the wrong side of the carpet stick the needle through to the right side on a slant so that it goes in about ⅜ to ½in. from the raw edge and comes out through both the carpet and binding about ⅛in. from the edge. Guide the binding along the edge of the carpet by holding it between thumb and first finger (Fig. 3). Make the stitches about ½in. apart.

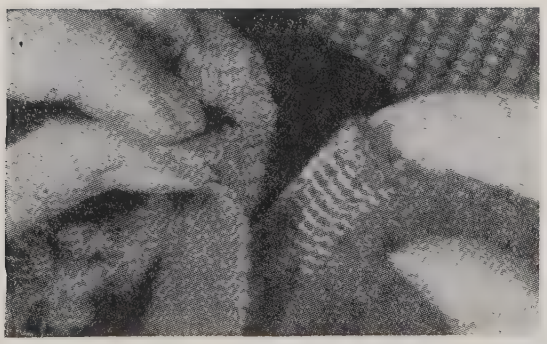
Fig. 7—Turn in the ends of double fringe, slip the rug edge between the two bands, and pin in place.

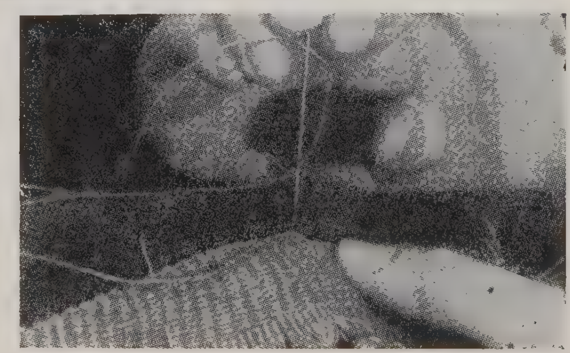
Fig. 8 — To sew fringe to rug with stab stitch push needle straight through rug, catching the edges of the two bands of fringe.

When the binding is sewn on fasten the thread by making two or three stitches backward to form an "X" over the edge. On the last stitch loop the thread around the needle and draw it up tight to secure the binding so that it will not rip.

Fold the 1½in. of binding left at the end to the wrong side, on a diagonal, so that the corner will not show when the binding is turned over the edge of the carpet. Then fold the binding over the raw edge of carpet to the under side. Draw binding down smoothly, but be careful not to pull it so tightly that the binding slips up over the raw edge of carpet. Fasten the end of the binding securely with small stitches through the selvedge of the carpet and the fold of the binding (Fig. 4). Sew the loose edge of bind-

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A Brown Robe and a Bowl for Rice.
The Stream for Water
The Sky for Roof, a Mat for Sleep,
The Stars for Meditation.
His Goal along the Road of Life
The Hereafter.
—(From the Sanskrit).

ing to carpet back, catching only a few yarns of the carpet and about ⅛in. of the binding (Fig. 5). Make these stitches about 1in. apart. On the right side only a narrow edge of binding will show; on the wrong side there will be an inch or more to protect the edge of the carpet (Fig. 6).

Fringe

To apply the kind of double-edged fringe that serves as a binding first turn in an inch of the fringe at one end and then slip the rug between the two finished edges of the fringe. Make sure the cut edge is pushed between the two bands at least ½in. Pin the top edge of the fringe band in place all the way across the cut end of the rug (Fig. 7). To finish the end turn in an inch of the fringe bands on the second end as you did on the first. Pin the underneath band in place.

Use a darning needle threaded with carpet thread to sew on the fringe. Take several stitches at one end, one on top of the other, to fasten the thread. Sew the fringe on with a stab stitch—that is, from the right side stick the needle in, catching the edge of the top band of the fringe (Fig. 8). Push it straight through the rug and through the under fringe band—three thicknesses in all. Stick the needle back through the rug by putting it just outside the loop in the edge of the underneath fringe band. Bring it out on the right side, about ¼in. from the first stitch.

Finish the ends by slip stitching the folded edges of fringe together.

To apply single-band fringe fold under an inch at one end, then pin the band to the right side of the carpet so that it overlaps the rug about ½in. (Figs. 9 and 10). Be sure to get the fringe on straight. Use as a guide either a crosswise row of pile or a crosswise yarn on the wrong side. With a coarse darning needle and carpet thread that matches the fringe, sew the fringe to the rug with a stab stitch (Fig. 8). Stick the

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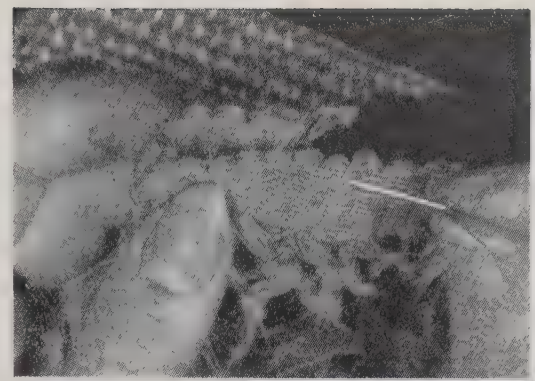


Fig. 9—Turn back the end of single-band fringe 1in. and pin.

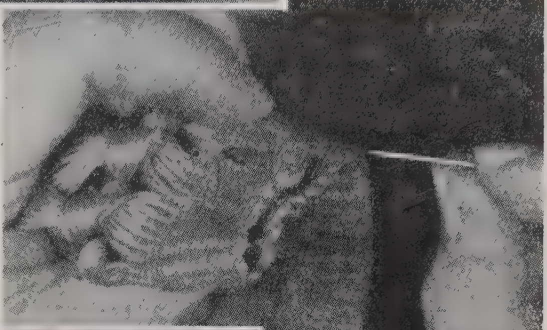


Fig. 10 — Pin single-band fringe to right side of rug, overlapping edges ½in.

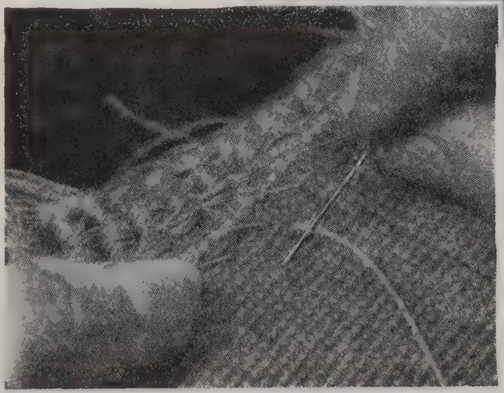
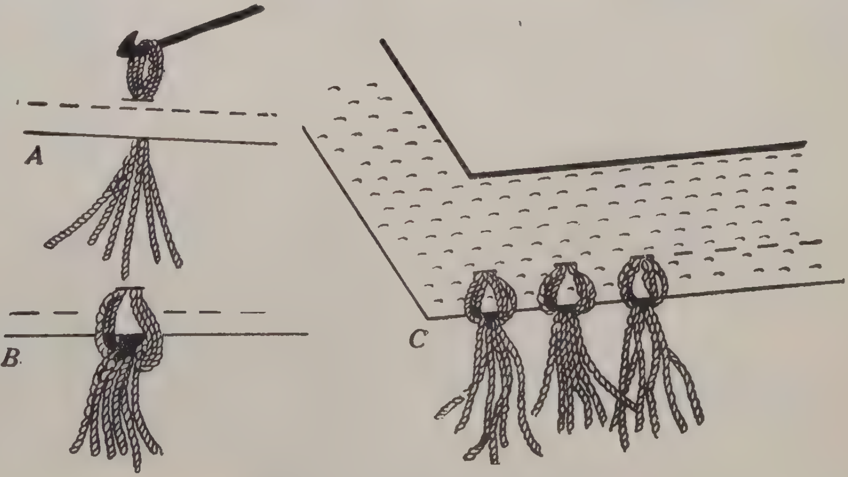


Fig. 11 — To stick needle back from the wrong side in the stab stitch follow a cross-wise yarn so the needle comes through just outside the edge of fringe band on the right side of rug.



Making a home-made fringe.

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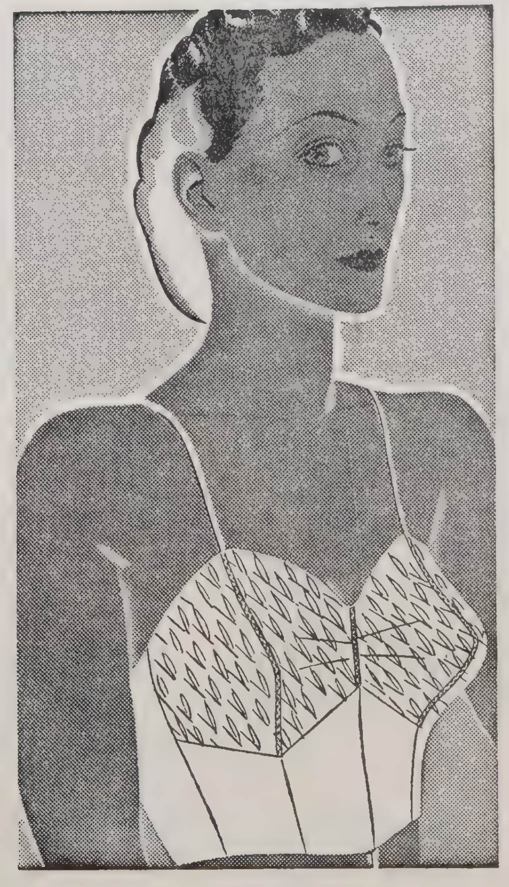

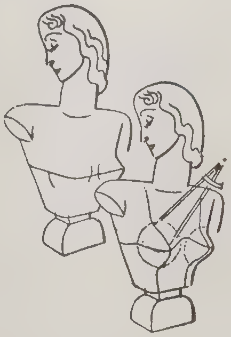

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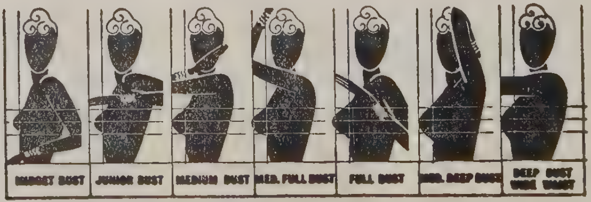

needle back to the right side, as shown in Fig. 11.

Home-made Fringe

If the ready-made fringe was unprocurable, rugs, especially bedroom or hearth rugs, may be finished with hand-made woollen fringes. Find a harsh wool that matches the ground work of the rug and wind evenly over a card 3in. in width. Cut along one edge, leaving strands 6in. long. With a coarse bone crochet hook part strands of the rug fabric just behind the newly-bound edge. Insert hook on right side and catch the doubled end of a bundle of strands. Pull loop through to right side and catch the loose ends through loop to form a knot. Pull firm and smooth evenly over the bound edge; continue to insert bundles of wool and knot them at even spaces along the edge to be refringed.

Worn Selvedges

Trim badly-worn selvedges, overcast the raw edge, then finish with carpet binding that matches or tones in with the body of the rug. Lay the binding on the rug, right sides together, so that the edge of the binding is about ⅛in. from the edge of the rug. Allow about 1½in. turn-back at each end. With a large darning-needle and carpet thread, sew the binding to the rug with short stitches. Put in an occasional backstitch. Make this line of stitching about ⅛in. from the edge of the binding (Fig. 12). Turn under the 1½in. of binding at each end, folding it on a diagonal. Then fold the binding over the edge of the rug to the wrong side. Sew it to the back of the carpet, catching only about ⅛in. of the binding (Fig. 13).

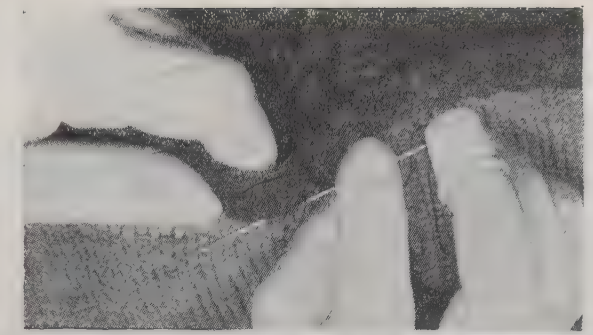

Fig. 12 — Sew carpet binding to trimmed edge of rug.

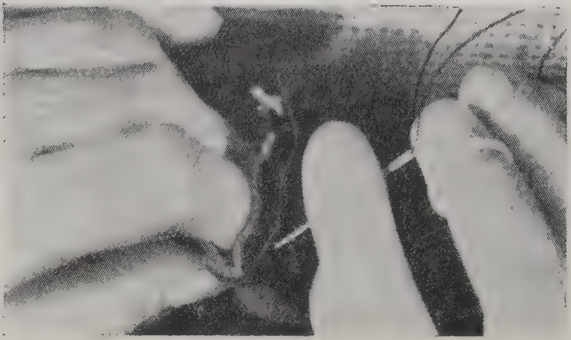

Fig. 13 — Sew binding to back of rug.

Mending a Tear

When a tear in a carpet or rug has not frayed too much darn the edges together. With a large darning needle and carpet thread or matching coarse wool weave in and out from the under side (Fig. 14). Be sure to keep the loose ends of carpet yarn on the wrong side while you are darning, then clip them to about ½in. in length. Spread the ends evenly so as to prevent a bump; pin a strip of carpet binding or strong material over the darned place, on the wrong side; and sew edges of binding to the back of the carpet (Fig. 15).

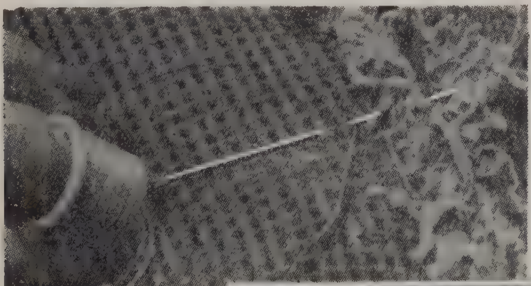

Fig. 14—Darn the frayed edges of rug together from the under side.

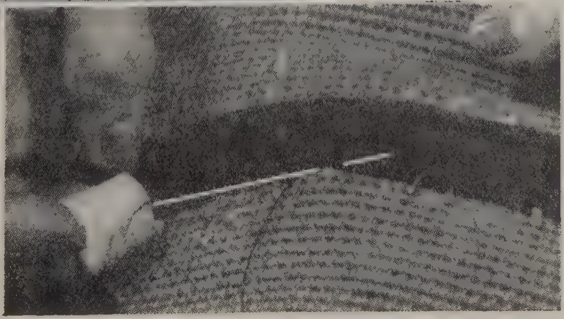

Fig. 15—Cover the frayed ends with carpet binding.

Rations in Britain

SEND FOOD!

Now more than ever it is up to us to help our friends and relatives overseas in their great need for essential foods. Still greater reductions have been made in their rations—they want all we can send them of essential fats, meats and sugar. None of us knows what it means to really want good food, to be short of anything. We have a boundless store here of everything Britain needs.

They cannot ask us for food, we must send them these little choice parcels as a spontaneous gesture of our feeling and goodwill. The demand is terrific—but the sending of these parcels means so much. We wish you could read the replies of thanks that we and others have received.

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We have established a special department to make up and despatch parcels for you. There is a series of 20 parcels to choose from. All you have to do is to write in to us for a price list and full details. Then send in the name and address of the person to whom you wish the parcel sent, together with your remittance, and we do the rest. A simple little action on your part which means untold happiness to some loved one overseas.

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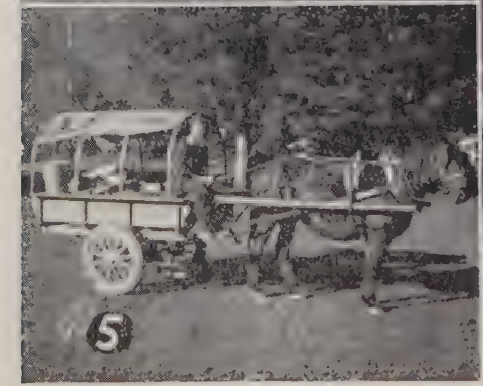
Further Photographic Competition Entries

1. *Tulips*
"Fintry," Glencoe.
2. *Mount Madeline*
Mrs. I. Rollinson, Murchison.
3. *The engineer*
Mrs. A. A. Dick, South Canterbury.
4. *"Onward and upward!"*
Miss M. P. Gregory, Gisborne.
5. *Herd tester*
Mrs. I. Rollinson, Murchison
6. *Snow plough*
Mrs. A. A. Dick, South Canterbury



"If I Had a Magic Carpet"

ENGLAND would still be the Mecca of the majority of "Good Neighbours" if they had the opportunity to travel abroad, but quite a number would also wish to visit other parts of the world—South America, Switzerland, Scandinavia, Persia, Canada, Africa, Russia, Tibet, and U.S.A. Some want to explore New Zealand more thoroughly, and one adventurous soul would like a trip to Mars!

"M.E.H.", Central Otago, was placed first, "Fleurette," Takanini, A. M. Dowell, Taranaki, and "Tiggetty Boo," Katikati, tied for second place, and "Susan," North Auckland, was commended.

First Prize

SINCE I was a child I have had a longing to visit South America, land of mystery and romance. When I was eight or nine to me South America meant Brazil, and Brazil Rio de Janeiro, for I had a young and pretty aunt who had married and gone there to live. Her husband used to send me brilliantly-coloured postcards of Rio and its surroundings, often with funny little messages on the back. Sometimes he described Rio with its harbour, its sugar-loaf mountains covered with lush tropical vegetation, and the wonderful effect of looking down on the city through palms and bamboos from the summit of Cordocova. It intrigued my imagination.

When I was older a neighbour's son went to Valparaiso in charge of a cargo of sheep bound for Argentina, so I became conscious of another side of South America. I listened entranced while he told us how, when the ship was lying in Valparaiso Harbour waiting for the sheep to be disembarked, he saw high up in the clouds the snow-clad peak of Anaconga, the highest mountain in the Andes, in fact, the highest peak in either of the Americas.

When drinking cocoa on a cold winter's night I would think of the rich jungle lands of Ecuador, where the finest cocoa in the world is grown. I would picture Quito, the capital of Ecuador, 9,000ft. above sea level, yet with roses, stocks, and pansies flourishing there in that buoyant air. I would try to visualise that exquisite sight high above Quito where against the background of the Andes one can see humming birds hovering against the snow like shimmering pieces of silk.

I want to see the Incas' temple of the sun on Lake Titicaca, the emerald mines in Colombia, the wild rubber growing at Para where the Amazon empties into the sea, and the thousand and one sights my magic carpet could show me.—**"M.E.H.", Central Otago.**

Second Prize (Equal)

IF I had a magic carpet, I should like best to visit gallant little Norway, the birthplace of my father, famous home of Grieg, and romantic land of the indescribably beautiful midnight sun, glorious fiords, snow-covered mountains, and wild and lovely lakes and dales. In Norway, too, I'd find so much still coloured with mediaeval picturesqueness. I know I'd spend fascinating hours listening to tales told by the real country folk, of sprites and fairies, and put out for the "little people" at night the food they like to eat and indeed expect as their due! I should learn to make coffee in traditional fashion (first roasting the fragrant beans in a heavy iron vessel over the fire and grinding the coffee in a small iron hand-mill), and spin wool on a quaint, centuries-old spinning-wheel. 'Twould seem like a very wonderful and beautiful dream. O, magic carpet, please hurry up and call for me.—**A. M. Dowell, Taranaki.**

Second Prize (Equal)

MY destination is England, cradle of our race — dear, beautiful England set in a silver sea. How I'd love to close my eyes and hey presto! open them in London. see Westminster Abbey and St. Paul's, go down the Mall to Buckingham Palace. and watch the Changing of the Guard. Perhaps I'd be lucky enough to glimpse the King and Queen and the two Princesses.

I'd grieve, too, over London's noble scars, the beauty lying in ruins, and I'd honour those valiant British hearts who stood firm and "took it" during the blitz. I'd view London's bridges and the Thames and Hyde Park, and I'd like to visit the House of Commons and hear a speech by Mr. Churchill. Then I would go on wandering through the Empire's capital, steeping myself in its sights and sounds. I would look upon York Minster and the ruins of Coventry Cathedral; Liverpool, where so many of our cargoes go; Plymouth, too.

But my magic carpet would not leave me in the cities—it would take me to the countryside. I'd smell the scent of English hedges, walk down lanes and see the birds, and watch the buds break into leaf and clothe the trees with spring's soft green. I'd linger in the bluebell woods and gather primroses beneath the trees and hunt for violets. I'd stand beneath spreading oaks and visit the beautiful parklands belonging to noble old homes. I'd stand on the cliffs of England and look out across her rolling seas as my forefathers did before they took the long journey to New Zealand; I'd watch the storms roll up and lash the coast. Even the mists are a part of England.

Such a visit would not be complete without a London crowd and a trip to a famous racecourse or Henley Regatta to see our kinsfolk in holiday mood. All these I'd wish to see, and many more. Some day, perhaps, good fortune will grant me my desire. —**"Tiggetty Boo," Katikati.**

Second Prize (Equal)

IF I had a magic carpet I would travel on it to Mars. On the magic carpet of my books I have already traversed all of the earth that interests me. With H. V. Morton and Victor Canning I have made leisurely, amusing tours of the British Isles and Europe; and with Pearl Buck and Louise Jordan Milne I have lived and suffered and found joy and content in China. I have shivered across Siberia with Noel Barber, and sweltered through the Belgian and German Congo with Negley Farson. The jungles of Venezuela and Brazil have been laid wide for me by Peter Fleming and Julian Duguid; and Freya Stark has opened up the incense routes of Arabia. These journeys may have been one-sided, the viewpoints may be prejudiced, or the geographical details inaccurate, but they are actual places that I can follow on the map and view in pictures.

But Mars! Ah, what a different story. My only guide books are the

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ISSUED BY THE DEPT. OF HEALTH

DANGER TO A CHILD'S HEART

RHEUMATIC FEVER IS CHILDHOOD'S GREATEST HIDDEN ENEMY

It occurs between the ages of 5 and 14 years chiefly, and causes most of the heart disease that strikes at people under the age of 35.

Rheumatic Fever affects school children more seriously than any other disease, and if not taken care of properly, may cripple or shorten life.

It may attack in a straightforward and recognisable manner, starting off with a sore throat, tonsillitis or a cold. There may be feverishness, or nose-bleeding, disinclination for food, *inflamed joints that are painful,* and a temperature of up to 103°. Usually the pain begins in a single joint and spreads to others. The heart will beat rapidly and there will be night sweats.

If that happens then the picture is clear. It is Rheumatic Fever. It means calling in the doctor and obeying his instructions. Prolonged rest in bed is an important part of the treatment.

Often, however, rheumatic fever does not announce itself so clearly. There may be a sore throat, a slight fever, a nose-bleed, poor appetite, and a complaint about those "growing pains" in muscles or joints. Or there may be merely irritability and nervous habits. These, too, can indicate rheumatic fever, especially if the family has a rheumatic fever history.

St. Vitus dance (chorea) in children is a nervous manifestation of rheumatic fever, and it damages the heart just as seriously if not treated. Twitching or those so-called "growing pains" may be a danger signal.

Quick recognition of the symptoms and immediate medical treatment will check this under-cover threat to the heart. One attack of rheumatic fever often leads to others, and the second and third attacks are most frequently the source of heart damage.

Damp, fatigue and exposure favour the disease. In a susceptible child, therefore, take particular care against weather changes, provide suitable clothes, and insist on proper sleep and rest, and a balanced diet.

WATCH OUT FOR THOSE DANGER SIGNALS

23a

FOR A HEALTHIER NATION

fantasies of H. G. Wells and Jules Verne, and my only pictures the incredible ones of my own imagination. Oh, to solve the thousand burning questions its very name conjures! Would I find it in the chaotic condition of the earth two or three million years ago, with unbelievable and abominable creatures just emerging from the slime of the Jurassic Age? Or would it be a world of super-perfect beings with all "the crooked straight and the rough places plain"? Would there be life at all, or just the stark, airless, waterless mountains of the moon?

But my carpet is still on the weaving loom. Some day, however, science will complete it, and our descendants on a magic carpet—something like Buck Rogers's space-ship?—will solve all these riddles.—**"Fleurette," Takanini.**

Competitions

AUGUST

The competition subject for August is "The Month I Like Best." Closing date, August 15.

SEPTEMBER

Recently I received a letter from a bride who has gone to live on a backblocks farm where conditions approximate those of the pioneers. However, she and her husband consider themselves very fortunate, as they have wonderful neighbours.

Knowing how important neighbourliness is in country districts, I would like to have your opinions as to what are the essential qualities a person needs to possess in order to be a good neighbour.

There will be a prize of 10/- for the best essay, and a second prize of 5/-.

"THE ART OF BEING A GOOD NEIGHBOUR."

Entries must reach me by September 15.

"MARY,"
"Journal of Agriculture,"
Box 3004, Wellington.

Commended

I AM off for a trip to America, a country I have always longed to visit. The magic carpet has transported me thither, and I am hovering over the Statue of Liberty at the entrance to New York Harbour. I cross Brooklyn, fly over New York and the Great Lakes, and admire the Niagara Falls. I now turn south to view the Mississippi, the longest river in the world. Westward are the prairies. It is autumn and the ripe corn looks like a vast yellow sea, the railway running through like a line drawn by a Titan from horizon to horizon.

I now see below me Yellowstone Park with its geysers and hot springs. Before I cross the Rockies I view the Grand Canyon of the Colorado River. Last of all, I visit the Yosemite, another national park, and gaze with wonder on its huge rock gullies and waterfalls and its giant sequoias, many of them over a thousand years old. I close my eyes and in a twinkling I am carried over the blue Pacific and back to New Zealand!—**"Susan," North Auckland.**

I DREAM of a fair isle, set in blue seas, with a fringe of white surf breaking lightly on an outer reef. Tropical flowers and fruits grow to the water's edge, and there is a beach where I can lie in the warm sun, or sit and fish with no effort at all. There is no hurry to prepare meals or sweep or tidy up—here are wonderful bays to explore, and a drowsy content.—**"Polly," Northland.**

WE look down on a barren arid country; very sparsely populated. Mountain ranges rise in the north and east. We are in Persia. We travel rapidly northward, the country changing in character as we approach the frontier. The Black Sea can be seen on the left and the Caspian on the right, and the country is now lush and green. Before us towers the mighty rampart of snowy peaks forming the Caucasian Mountains, which make our New Zealand Alps dwindle in memory to mere foothills.—**"Late Comer," Feilding.**

IF I had a magic carpet
To carry me far away,
I'd go to good old London
Where my memories often stray.

There are the old grey alleys,
The steeples and the towers,
The parks alive with friendly birds,
The fragrant English flowers,
The memories and traditions,
The cold grey mist and rain—
Oh, to go to London,
London Town again!
The dustmen and the newsboys,
The humming of the wheels,
The London-in-the-heart-of-things,
The Never-down-at-heels.

Back in good old London—
Laughter in the rain;
Robins sing in London
Now it's spring again.
Their spirit cannot be destroyed
By any German bomb,
So off I'll go to London
Back to my old home,
The dustmen and the newsboys,
The humming of the wheels,
The London-in-the-heart-of-things,
The Never-down-at-heels.
—**"Arethusa," Cambridge.**

IF I had a magic carpet my destination would be Palestine, cradle of the world, and geographically the centre of the earth. Life in Palestine has changed little since early times. How interesting it would be to see the Bedouin, descendants of Ishmael, living in the "black tents of Kedah;" to look upon the ranunculus, narcissus, cyclamen, lilies of the field, and marguerites of many kinds. I would like to linger beside the pool of Bethsaida and of Siloam. The brook Cherith, Jericho, the city of palms, Bethany, Nazareth, the road to Emmaus are names which are music to my ears. I would like to see Tel Aviv, that great modern city built by the Jews exiled from Europe; the cedars of Lebanon; and the hill called Olivet.—**"Golden Amber," Frankton.**

"SOME DAY IT'LL WORK"

A FRIEND of mine has a great many gifts which have been sent to her from the Middle East. One of them is a magic carpet. I think it is the most beautiful piece of work I have ever seen. It is like an ordinary mat, only much thicker, and it is large enough to sit on with comfort on the floor. Around the edge is a fringe of scarlet tassels. The carpet itself is worked in an intricate Eastern design in several colours, but the most wonderful part about it is that whichever way you hold it to the light the colours and pattern appear totally different all over the carpet, until it becomes just a dazzling piece of colour, and the effect is startling. I could hardly believe that it was worked in the same design, with the same colours all over, and it needs a very careful inspection before you can be sure that this is so.

My friend is naturally very proud of her magic carpet, and I asked her if she had tried it out to see if the magic works. She laughed and said, "No, I would rather keep the illusion that some day, if I really wanted it to, it would work."—"I.J.S.", Otaki.

I WOULD like to see some of the more inaccessible parts of our own lovely country—lonely Stewart Island; the majestic beauty of Milford Sound as one enters it from the sea; the innumerable little bays and inlets of Queen Charlotte Sound, some of them as quiet and peaceful as they were when Captain Cook sailed up the harbour in his "great white bird." After flying over the Alps in the radiant light of a Westland sunset, and following the Buller as it twists through the gorge, I would visit the North Island to see the gannets on Cape Kidnappers; the crater lake of Mount Ruapehu; the Bay of Islands; and Spirits Bay, which the Maoris claim to be the place where souls departed for the spirit world.—**"Francisca," Westland.**

ONE reads of the beauty of Canada in such books as Ralph Connor's "Glengarry Days"—this vast land must be very interesting to visit. I would also like to go to the land of the thistle with its crags and lochs, and visit the Isles before journeying to the homeland of our Jersey herds. Then I would travel to Iceland, to satisfy a doubt I have always had as to whether Iceland poppies grow there as commonly as daisies in summer.—**"M.", Feilding.**

I WOULD go to Russia: to Moscow where the ancient towers of the Kremlin stand black against the sky; to Leningrad, that gallant city whose factories during the siege operated on a 24-hour basis; to Stalingrad, where new life is stirring, and amid the devastation people are busy restoring factories, mills and shops. I would go to the Ukraine and sense something of the timelessness of the seasons as I watch the harvesting of the crops. The Revolution did away with the blessing of the land by the priests before planting on a date ordained by them. Now the crops are planted in the spring and ripen with the lengthening days. Superstition is no longer responsible for the failure of the harvest. I would go to Siberia—on these vast, treeless plains the Cheliabink Station of Agricultural Science has carried out such wonderful experiments with wheat, sugar beet, and potatoes. — **"Marguerite," Marton.**

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"Look out for Pneumonia!"

Contributed by The Department of Health

WE have reached the period of the year which brings with it chills and changes, colds, bronchitis, and pneumonia. As you don't particularly want to catch pneumonia, there are a few simple things you should know before winter really arrives.

The cause of pneumonia is a germ —known medically as the pneumococcus germ. He claims victims any time in the year, but his favourite time is late autumn and winter, when our bodies are not so resistant.

Aiding the Enemy

We help this invader to establish a bridgehead in our lungs by doing things that lessen this resistance. One or other of these things, or a combination of several of them, such as skimping sleep and rest, keeping fresh, cool air out of buildings, not taking exercise outside because of inclement weather, not eating rightly—yes, that balanced diet raises its responsible head once again—and doing too much overtime so that you exhaust your reserves of resistance and vigour—any of these things will undermine your health.

Having thus laid yourself open to attack, the next step in helping the pneumococcus invader is to get a thorough chill. Normally a chill is a little matter, but if you're already run down or have a cold, a chill may be followed by fever, and then you'll probably be in for a bout of pneumonia.

Another way to help the treacherous germ is to pretend you're tough and neglect a cold. Whenever you are suffering from 'flu, a severe cold, or you're not throwing off a cold easily, that's the time to remember the pneumonia germ. These infections of nose, throat, or lungs help him to gain a footing.

Resist the Invader

There you have the prescription for pneumonia—but you've only to reverse this prescription to keep fit this winter. Get your eight hours' sleep and see that your children have 10 to 12 hours' sleep, according to age. Make up for short sleep on party nights by extra sleep the next night. Open the windows and ventilate your office or working place, and get out of doors as often as you can. Don't be working back night after night through winter; have a spell and some relaxation—you'll work better in the long run, and you won't lower your resistance. Lastly, and this is most important, eat a well-balanced diet, rounded off with a daily dose of cod liver oil or a substitute.

Dodge chills this winter. Wear thicker top clothes instead of swathing yourself in winter flannels, and aerate your skin by persisting with cellular type underwear. Carry a warm overcoat to counter a cold snap. Change rain-wet clothes, and see that your footwear is in watertight condition for the cold, wet months ahead. It is very much better to have warm clothes and a cool room than to work in overheated rooms. Those warmly clad with cool fresh air round their heads are better able to stand the change to cold outside, and resist chills.

Be careful with colds—avoid people with colds as much as possible. But if you catch one, keep your sneezes and coughs covered, and go to bed if it is severe or doesn't clear up as quickly as it should. Coughing, a temperature, pain in the side or chest, rapid or tight breathing, and thick rusty sputum—these things usually mean pneumonia, and you must call your doctor—the earlier the better if the sulphonamide drugs are to win the battle.

Plan now to avoid pneumonia—that means keeping fit, dodging chills, and treating colds with respect!

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A

Hosts and Hospitality

WHAT I really love doing is making our many guests feel at home. We have a tiny house and four kiddies to pack into it, but ever since our marriage 12 years ago our small "Elisha's room" has scarcely ever been empty at week-ends. Our visitors are mainly young people—weary nurses, training college students, or lonely folk, and they all remark on the atmosphere of home.

These are a few of the simple rules I have made for their comfort—I try to serve meals punctually, so that visitors can arrange their day accordingly. I always serve breakfast in bed for the guest, and send in a simple tray adorned with a fresh flower or two. The kiddies love to help in this little task. I impress on our visitor that she isn't making any extra work. This is important, for nobody can rest properly if she feels she is a burden to a busy mother. I insist on the children being quiet during the visitor's rest-hour: it not only helps to restore jaded nerves in an adult, but it trains the children to be considerate to others. Cups of tea are always available and visitors are free to help themselves to fruit or food any time they wish. The children's manners are corrected as little as possible during meals, thus keeping mealtimes cheerful and free from discord.

Guests greatly appreciate small acts of thoughtfulness, such as having a hot water bottle filled, slippers warmed by the fire, flowers and books in the bedroom. At night when we have company we put the children to bed as early as possible, so that a period of relaxation may be enjoyed. My husband combines with me in endeavouring to make our home a place where tired, depressed, or sick folk love to come. To send each one back to the busy world cheered and refreshed in mind and body is our constant aim, and our own home life is all the richer and fuller as a consequence.—**"Anne Margaret."**

SLEEP

Now blessings light on him that first invented this same sleep: it covers a man all over, thought and all, like a cloak; it is meat for the hungry, drink for the thirsty, heat for the cold, and cold for the hot. It is the balance that sets the king and the shepherd, the fool and the wise man, even.

—Cervantes.

Arts and Crafts

"Those who love the arts are all fellow-citizens."—Voltaire

IN my previous article on the Wellington Technical College I described the work of the Modelling Department. This time I want to tell you about further branches of arts and crafts sponsored by the school. Many pupils who are busy with other courses cannot give more than an hour a week to this form of self-expression, yet these brief periods of tuition are productive of remarkably good results.

I HAD not realised before how effective a simple piece of cross-stitch can be when embroidered in coloured wools on canvas and converted into a bag or a belt, a kettle-holder or a needle-book. Each design was first drafted on graph paper, which served in the nature of a chart to guide the young needlewoman as to how many stitches to take and what shades to use. Butterflies and bluebirds, flowers and fishes, though very decorative, yet appeared almost to come to life. A group of dancing figures expressed the very essence of rhythmic movement, while the prevailing modernistic trend was evinced by geometric patterns in bold colourings. I also discovered that most attractive openwork sandals could be evolved from cross-over straps of this tapestry attached to leather soles—a decidedly original idea and one which I know would commend itself to many a housewife who is handy with her needle. One ambitious lass had even constructed a wedgie heel from a piece of wallboard, and very smart it looked, too, with its covering of scarlet suede. Moccasins are another form of footgear which the students enjoy making. The sheepskins for this purpose are usually dyed brilliant hues, and the resultant array of slippers rivals the glories of Joseph's cloak.

Thoughts On Beauty

The only true physical beauty is that which reflects beauty of spirit.

Take away from our hearts the love of the beautiful and you take away the charm of life.—Rousseau.

Beauty, truth, and goodness are not obsolete:
They spring eternal in the breast of man.—Emerson.

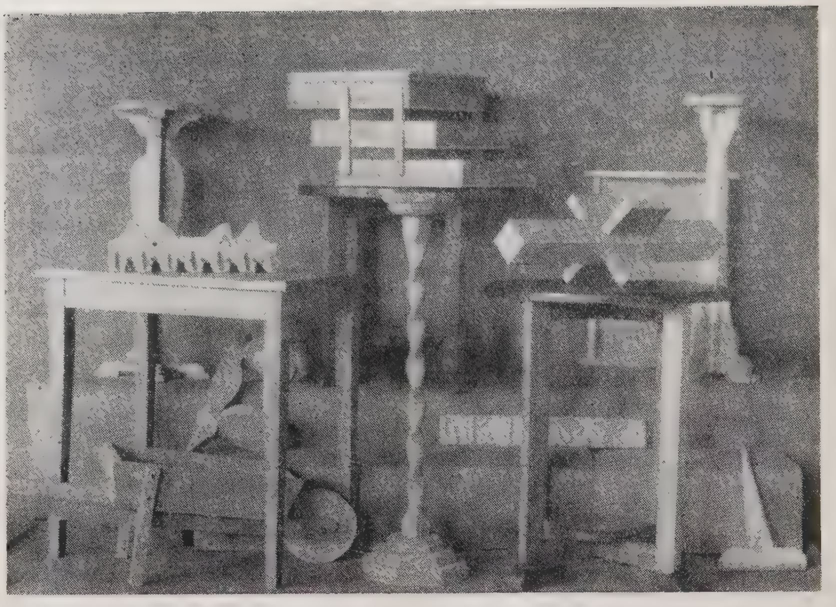
No beauty's like the beauty of the Mind.—Cooke.

To keep in sight Perfection, and adore
The vision is the artist's best delight.
—Sir W. Watson.

The needlework samplers undertaken by the first-year pupils were models of neatness and displayed all kinds of stitchery, including Y-stitch, lace-stitch, and satin-stitch; needleweaving, eyeleting, and applique, the last-named following the Egyptian method of turning the edge of the applique material under and then hemming it. Once having mastered these rudiments the students could then turn their knowledge to account in the manufacture of various useful articles: knitting-bags and book-covers, carry-alls and cushions, and a positive bevy of tea-cosies. Prevailing difficulties in securing suitable materials had not been allowed to hamper their efforts, and it was a revelation to see the many ways in which coloured hessians could be used to advantage.

Senior students are also required to do samplers. These not only exhibited considerable technical skill, but each sample of embroidery, though entirely different from its companion, was so arranged as to blend into a pleasing whole; for instance, a square of Roman cut-work was balanced by a medallion of richelieu; next to an Elizabethan motif in ebony and crimson was a blue and red Jacobean design, while other stitches were grouped to resemble flowers and shells. Another pleasing item of embroidery consisted of daisy-like circles of blue felt scattered here and there on a round white cushion and buttonholed in violet. Incidentally, I was told that the cushion cover itself had been made out of unbleached calico, which goes to show what clever fingers can accomplish out of even the most ordinary materials. I am sure you all would

have admired the tablecloth bordered with lambs gambolling among spring flowers; the cosy and wagon set in fillet work; the applique picture of tropical palms and blossoms and wild geese in flight; the firescreen depicting a fairy-tale dragon with gleaming green eyes and gilded scales and fiercesome claws. Most of the students, however, had concentrated on modern Assisi work, a type of embroidery which originated in medieval Florence and has been adapted to suit present-day methods. The design is outlined in back-stitch and the background filled in with cross-stitch. This looks particularly well on tray cloths, runners, place-mats, and other table linen. All manner of familiar objects had been utilised by way of design—strutting turkeys and little brown rabbits; squirrels and trees; snails in companionable pairs; eels darting among forests of seaweed; kingfishers poised over jade-green water. One cloth had panels of kiwis, a typical New Zealand touch.



The joys of handiwork are not confined to the feminine sex only, for in addition to their natural aptitude for woodwork the lads made a splendid showing with their leatherwork. Handbags seemed to be their specialty: the long, envelope kind which are so fashionable at the moment, being ideal repositories for the multitude of articles we find necessary to carry about with us. There were several I liked particularly—one, a light beige in an interlacing Celtic design; a second, of navy embossed with acorns; a third, upon whose smooth surface were tooled fishes and sea-anemones in an under-water setting, the rose and green and ultramarine tints having been obtained by spirit dyes; and another, featuring a woodland scene, the deer and tree being in the Jacobean manner and beautifully coloured. Stool-tops and writing-cases also lend themselves to this ornamental treatment, and I wish you could have seen the glorious sunset which graced a pair of book-ends. Even such mundane things as belts took on a decorative note when adorned by galloping horses. Indeed, most of the belt-owners were so proud of their efforts that they had requisitioned them for personal use and were extremely reluctant to part with them for display purposes!

There was also a special hobbies room, and pupils not only received instruction but could take their models away and continue working on them at home if they wished to do so. When I visited the room it presented a decidedly masculine appearance, the benches being covered with miniature aeroplanes and tommy guns, aircraft carriers, destroyers, and naval craft of every description.

Modelling is another subject in which boys take part as well as girls. Plaques, candlesticks, ornaments, busts, and pottery designs—all were the work of first- and second-year students. The models of stags and the one of a horse, although still in clay form awaiting the final touches, were outstanding examples of masculine skill. Equal competence was shown by the girl sculptor who was responsible for the delightful figure of a child resting after play.

In the Art Department a series of colour studies demonstrated the use of colour in composition. The practical application of design was shown in gay wrappers for toys and Easter eggs, and patterns for wallpapers and fabrics. If a special design is required—a Mexican theme, say—the student must first study the topography of the country concerned and learn something of its people and their customs before he starts drawing desert cactus and adobe huts and picturesque matadors, and thus a great deal of interesting information is gained in the process. Similarly, Maori mythology acquires a new significance for those desirous of incorporating Native symbols in design. Another pleasant way of stimulating interest in geography is by means of travel posters—I saw a very striking one carried out in monotones of blue and white, depicting South Sea island palms, snow-covered mountain ranges, the thistle emblem of Scotland, and mosques and minarets, and superimposed on these a clever arrangement of nebulous clouds and revolving spheres, indicative of air transport round the world.

Nature study is also popular, judging by the number of paintings of fishes and flowers, butterflies, and beetles. Even the "stick" insect was included, and the zoo was well represented by lions and tigers, polar bears, and parrakeets. Monkeys swung by their tails from exotic-looking trees and rosy-plumaged flamingoes waded in reed-fringed pools. The work which appealed to me most, however, was the series of illustrations for such favourite stories as "Cinderella," "Bambi," and "The Magic Wood," and the book jackets, the titles of which had been chosen by the youthful artists themselves. Classics like "The Arabian Nights," "The Swan," and "Tales From Grimm" rubbed shoulders with "New Zealand Forestry" and the adventurous-sounding "Sea Gold" and "Wild Horses." The elementary exercises in lettering had been rendered much more interesting by being set out in the form of a child's alphabet: "A is for Apple," and so on, accompanied by appropriate drawings.

In addition to the usual art classes the college also offers a course in preparatory art, and primary school children from 6 to 14 years of age can avail themselves of this opportunity to further their artistic ambitions. This venture was given considerable impetus by the exhibition of paintings by British children held in Wellington last year. The beginners seem to go in for floral arrangements, farmyard and domestic scenes, while the older ones show a preference for landscapes and still life, or try their hand at anatomical studies.

My chief impression at the close of my visit was not only of the general excellence and variety of the work, but its quality of joyousness—proof of the true pleasure experienced by these young students in their creative achievements.

Mary's at - Home -

WE have about 85 acres of land which we are clearing gradually. We intend to turn it into a "sheep, poultry, and tomato greenhouse" type of farm. There are several groves of kowhais on our land, and in October, when the blossoms appear, numbers of tuis come looking for the honey. Fortunately, the trees are well off the road, and the birds are thus safe from any mischievously-disposed schoolboys with the desire to throw stones.

Since Christmas we have had only one fine week with a single fine day now and again. At one side of our house we have a very large lawn and this has been so consistently covered with water that a pair of kingfishers which normally live beside a forest stream have taken up their abode at the back of the house. They spend hours every day on the power line which passes over the "lake," and I hope they are not too disappointed at the fishless condition of the same "lake."—**"Francisca."**

DON'T you like to come into a room that has books and magazines lying about and big bowls of flowers in odd and unexpected corners instead of the usual "vase" in the accepted place? Even bits of mending on a table give a homely kind of feeling—there's something of character in a room where signs of honest work are not hidden. Who has not felt the difference between such a room and one that is kept only for very special occasions? Let those who wish have their fine drawing rooms, but I prefer a living room where flowers, books, music, and darning vie with one another for attention.—**"Jonathan."**

TALKING about closing time, I thought this little remark was very apt: "He who watches the clock generally remains one of the hands."—**"Roundabout."**

AS a nation's strength or weakness is the outcome of the home life of its people, do you not think the following lines convey a timely challenge to the womanhood of the world?

"As long as there are homes to which
men turn at close of day;
As long as there are homes where
children are, where women stay;
If love and loyalty and faith be
found across those sills,
A stricken nation can recover from
its ills."

—**"Autumn Tints."**

HOW I've enjoyed your "Good Neighbour" pages these last few months. What a treasure-house you must have from which to glean all those wee gems of poems you tuck into odd corners. Here is a fragment you may not know:—

"In a swirling petticoat
Bracken-brown and berry red,
Mushroom buckles on her shoes,
Misty scarves about her head.
Autumn dances o'er the fields,
To the will-o'-wispish tune
Of a gypsy-hearted wind
Piping 'neath a yellow moon.
Dances, too, my gypsy heart
To the little madcap tune
The tiny will-o'-wispish wind
Pipes beneath a yellow moon."

—**"Tinkle Tinkle."**

I LOVED the various choices for the book competition. I gave it up when I had finally got my list down to about 60 or so. How interesting

The Plough

Chaste and pale the silver light of frosty grass,
And pale the sun's long fingers as they pass
In light caress upon the ploughing team,
Turning to gold the aura of their steam.
The horses like bronze wraiths are glowing;
Sharply upon the plough, the rays are showing
That steel which bites into the frozen land,
Shattering the sterile beauty of a fairy band,
Cutting a furrowed scar into the rich black soil,
Writing in long straight lines a script of toil.
Then come the hungry birds into the field
Searching for food the riven earth will yield—
That generous earth, so eager for maternity,
Waiting the seed to prove her vast fertility.
O, grant the mothering joy to arms so wide,
O, let her bring sweet harvest to the countryside!
Chaste and pale the silver light of frosty grass,
But through this static beauty steel must pass.

—Elsie M. Ryan.

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it must have been for you to read all the choices—people's tastes vary so, don't they? Of course, I would have been compelled to include in my list one of the much-loved volumes by A. A. Milne, either the "Pooh" books or the little poems, or "Ole' Brer Rabbit" or "Alice in Wonderland," which either my husband or I generally try to read to our children each night. If my husband reads about Winnie the Pooh, I find myself not rattling the evening dishes quite so much, so that I can listen in as well.—**"L.R.A."**

I HAVE been a most interested reader of your pages for several years. I thoroughly enjoy the essays and the paragraphs, and I have tried many of the recipes with great success.—**"Golden Amber."**

Lullaby

TO BARRY

Sleep, lovely boy of the fair downy head;
Rest in my arms, little flower.
Star-dust on drooping white eyelids is shed
As I lay thee in blue-ribboned bower.
Fragile white dreams from the star-scattered night
Flutter across closing eyes,
As clutching his cover with fingers curled tight
My darling in tiredness lies.
—Dear trusting face,
By pillow-lace,
Sleep as the day softly dies.

—M. N. Kelly.

I AM of a somewhat melancholy disposition, given to fits of depression, but I have my own cure for "blue" days. I recite fragments from "The March of Life," by C. J. Dennis, and one verse in particular:

> "And I am blest because my feet have trod
> A land whose fields reflect the smiles of God."

From my back door I see a wonderful vista of undulating hills, and green fields. I also have a glimpse of blue water with a range of purple mountains as a back-drop. And as I gaze upon this beauty a deep peace enters my soul and I feel this is indeed "a land whose fields reflect the smile of God."—**"Honeysuckle Rose."**

WHAT city children miss, with their bought scooters and kiddy-cars, compared with the country children's joy in manufacturing their own toys. From Mother's long-hoarded petrol case, a pair of pram wheels found on the "tip," and a liberal helping from Father's nail-box, my little girl made a cart that would go. The cow's cover is minus a few straps, but a dog must have harness, even though he doesn't show as much enthusiasm for this new game as he might have and has a habit of lying down in the shafts.—**"Kirsty."**

WINTER

Winter, sable clad, has broken the song of the lark,
Scattered, unheeding, the leaves in the park—
The pink-stemmed leaves of the sycamore trees.
He's silenced the flight of the bumble-bees,
Withered the grasses, bent the sedges,
Revealed the secrets of brakes and hedges,
Robbed the oak of its remnant leaves,
Stolen the magic the sunlight weaves.
He's slipped the rowan's crimson locket
With chrysanthemum petals into his pocket—
Ah! but see, in his wanton flight
He's dropped the ruff of an aconite!

—Gweneth Bell.

WHEN we were travelling down from Christchurch a few weeks ago I noticed that the grassy hollows in the meadows were full of rain. I have always loved those gathered waters and remember one at Wakefield with drowned buttercups in it, a reflected mountain, and a blackbird paddling! A glimpse of reflected loveliness—reflections have a strange beauty and attraction, don't they?—mainly because of their unexpectedness, I suppose.—**"Tinkle Tinkle."**

I THINK that one of the lovely things in life is a garden. Be it large or small, it brings a special joy to its

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owner's heart. Perhaps it may be years before one's gardening dreams are realised, but there is delight in that time of planning and toil.—**"Peggy."**

BOOKS—what comfort and uplift one can get from them. To read a good novel helps me to forget my own troubles as I live with the characters. A book like "Pioneer Women" makes one thankful for present conditions of living, after learning of the hardships women endured in years gone by. A visit to one's neighbour who lives at a distance is also appreciated. It may be an effort to get the youngsters ready, but if one is fortunate enough to be able to drive a car, then pay a call and come home feeling that yours is not the only family in the world after all. Perhaps you have found your friend in a worse plight than yourself and by your sharing of experiences your own difficulties fade into the past and you look to the future with courage and new hope.—**"Bluebell," Waitohi.**

JACK FROST

Creeping through the keyholes
On chilly winter nights,
Flying down the chimney
In silent icy flights,
Squeezing 'neath the doorstep
Until he slithers through,
A tiny man of mischief
Comes in to paint for you.

With your thoughts for brushes
He paints the whole night long
Pictures on your windows
As pretty as a song.
Dainty little fairies;
Butterflies in flight;
Birds with long, soft feathers,
Are all in glistening white.

Elves with pointed noses;
And busy honey-bees;
Tiny dancing rabbits.
And lovely shady trees;
Lakes and winding rivers
Are all among the clouds.
With these fairy pictures
The pane for you he crowds.

And when you wake each morning
In wonder you'll be lost
At the shining beauty
From the brush of old Jack Frost!

—Paulette A. Leaning.

WHENEVER I feel lonely and unhappy I turn to my piano. When I commence to play and become engrossed in the music time simply flies and I forget that I was feeling blue. After I've finished playing my mind is so full of thoughts concerning the music of the great composers that I find the world is full of sunshine even on the coldest, wettest day.

—"Pianist," Ashburton.

THERE is much to be said in favour of starting a home museum while the girls and boys are infants. Beginning in a humble way the exhibits may consist of a few sea-shells, acorns, pebbles, brightly coloured feathers, and so on. The kiddies themselves will love arranging their simple treasures in a case composed of three cardboard shoe boxes placed one on top of another and held together by a strip of paper pasted along the top and down each end. Heavy articles should rest upon the lowest shelf for stability. As the collection grows in volume and importance a more substantial receptacle will be necessary.—**"Meg", New Plymouth.**

HOW well I remember one Christmas long ago when we were children living in a small English village. My sister and I had contracted scarlet fever and were isolated in a small room on the ground floor. We were not very ill and were a source of interest to the village children. They used to bring bottles of hot water and diligently clean all the hoar-frost off the windows so that they could gaze at us within. On Christmas morning they came and sang carols to us and held up their gifts for us to admire through the glass. On Christmas afternoon the old doctor drove in his gig from the town. He stood with his back to the fire and told us fairy stories. When he was leaving he gave us each a lucky sixpence with a hole in it. Those sixpences are still among our treasures!

"Susan," Kamo.

THE children and I have been gardening and have done over all our plots. Now we are sending for a dozen prize gladioli, so we will have something new and lovely to look at later on. It wouldn't be a happy world to me without my garden. We've had bunches and bunches of violets this year. I found that they kept most successfully indoors for a week so long as there was no fire in the room and the flowers were put into a deep vase with water almost up to their heads.—**"Tiggetty Boo."**

Quiet

The earth is still;
Even the flock upon the hill
Moves not—its lone sentinel
Struck by the day's spell . . . .
Whispers no wind.
Life has just dropped behind—
The butterfly sleeps on the stem
Of a poppy's ruby gem,
And in the nests the birds
And on the slopes the herds
Dream of those shimmering distances
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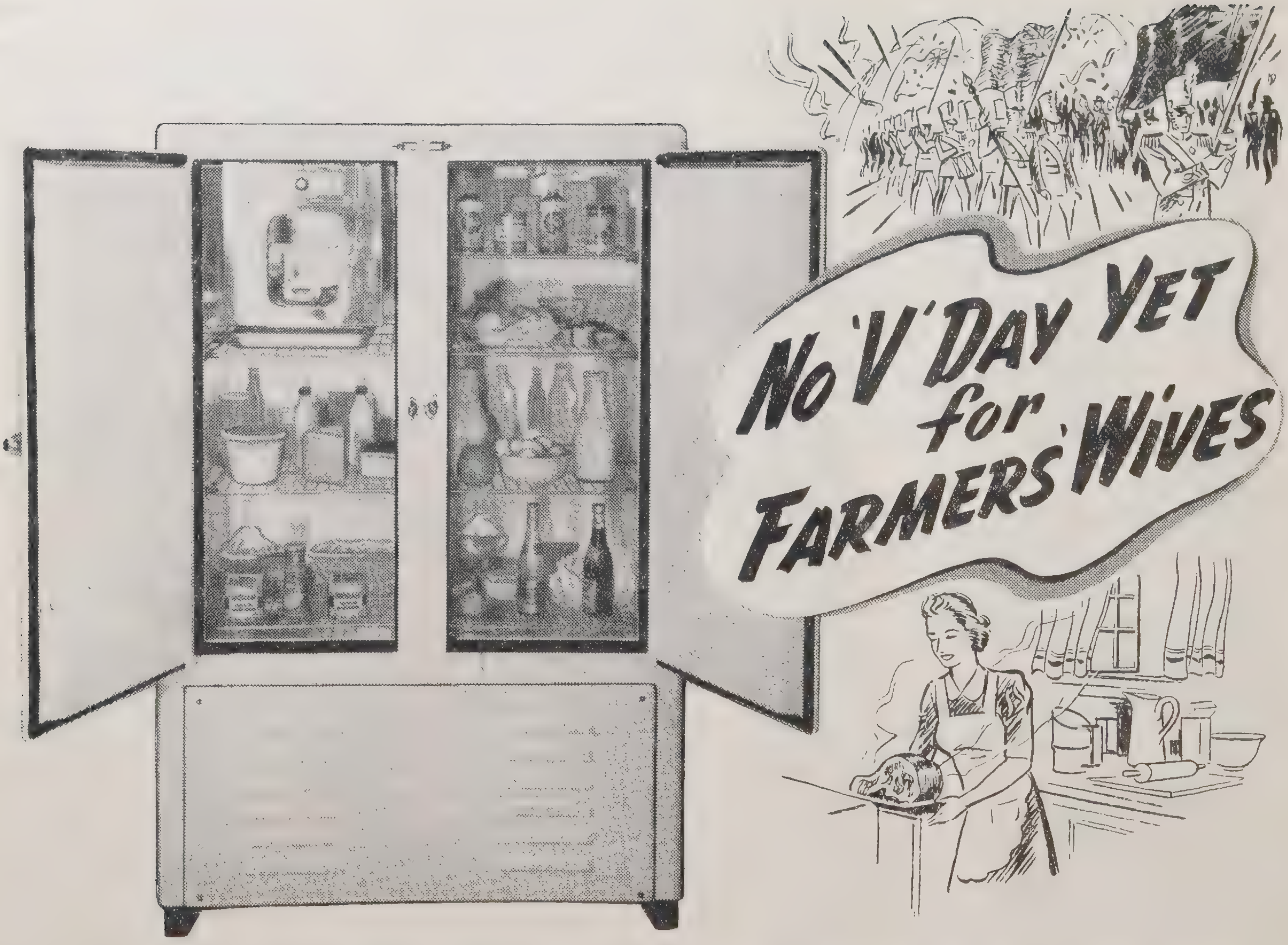
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SOUPS AND STEWS

THESE wintry days soups have a prominent place on the menu, for they are not only appetising, but combine the maximum of nourishment with the minimum of expense. It is not necessary always to have meat or fish stock as a basis—good soup can be made from vegetable water or milk. Soups are divided into four classes: Clear (made by clarifying first stock); broth (from unclarified stock with vegetables and cereals added); thick (containing flour, cornflour, sago, or egg); purees (which are thickened by rubbing the ingredients through a sieve and adding them to the stock).

Here are a few hints to remember when you are making soup: Add the rind of a lemon while simmering fish bones and trimmings for fish stock. A rasher of bacon chopped fine, and then fried brown and crisp, gives a delicious flavour to vegetable soup. Cooking the vegetables lightly in melted butter or dripping for a few minutes prior to adding them to the stock also improves a vegetable soup. Before putting meat or bones on the fire to simmer cover them with cold water and leave them to stand for a while in order to extract all the juices and gelatine possible. Always skim off any fat from stock before using.

Stewing is one of the best ways of ensuring that the nutritive properties of meats and vegetables are retained. It is also a saving of time and effort for the busy housewife, since everything is cooked in the one utensil. For a brown stew the meat is first dipped in flour and browned in a little hot fat before being stewed with the vegetables. When making a white stew this browning process is omitted, the ingredients being placed direct in a saucepan or casserole and simmered for the required time.

JULIENNE SOUP.

1 quart of brown or first stock, 1 carrot, 1 onion, ½ turnip, 2 sticks celery, salt.

Wash and prepare the vegetables. cutting them into thin match-strips. Cook in salted water, and strain when tender. Bring the stock to boiling point, pour it over the vegetables, and serve.

SCOTCH BROTH.

2 carrots, 1 leek, 1 onion, ½ turnip (large), spinach or other greens, 4 flowerets of cauliflower (optional), ½lb. dried peas, meat or vegetable stock, 1oz. fat, salt.

Soak the peas overnight. Wash the vegetables, and slice them, chopping the onion finely. Melt the fat and brown the onion in it, then add it to the other vegetables and stock. Simmer gently for 2 hours. Serve with cubes of bread.

BARLEY CREAM.

½ cup barley, 1 onion, 1 cup milk, seasoning, 7 cups mutton stock, 1 carrot, and 1 egg (optional).

Soak the barley overnight. Strain it and add with seasoning to the mutton stock and onion (minced), and simmer till the barley is cooked. (If using a carrot mince this with the onion, and add). Heat the milk and add it to the barley, and after the liquid has reached boiling point remove from the fire and leave to cool a little. Then add the egg well beaten and place the soup over a moderate heat, stirring all the while, till the egg is cooked. On no account allow the soup to boil once the egg has been added. If you wish to omit the egg, thicken the soup with 1oz. flour made into a smooth paste with a little cold milk. Serve with croutons of toast or fried bread.

CREAM OF CELERY.

2 cups celery (chopped), 1 quart milk, 4 tablespoons flour, 1 cup cold water, salt.

Cook the celery in the water until tender, then add the salt. Blend the flour with a little milk and stir into the celery water. Add the remainder of the milk which has been heated, and combine thoroughly with the celery. Serve accompanied by squares of toast.

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LENTIL PUREE.

1¼ cups lentils, 1 onion, 2 carrots, 3 stalks celery, 1 tablespoon fat, 2 quarts water or stock, seasoning.

Wash the lentils thoroughly, prepare the vegetables and dice them, and add all to the stock or water. Mince the onion and fry in dripping, then add to the soup. Bring to the boil and simmer till vegetables are done. Press through a sieve, reheat, and serve. A small quantity of tomato pulp or a bacon rind or a sprig of thyme may be used in addition to heighten the flavour of the soup.

POTATO AND PARSNIP PUREE.

1 cup potato, 1 cup parsnip, 1 onion, salt, 2 cups stock or vegetable water, 2 cups milk, parsley.

Wash the vegetables, chopping them and placing them in a saucepan with the stock and salt. Simmer till cooked, then press through a sieve. Add the milk and re-heat, stirring gently. Serve hot with a sprinkling of finely-chopped parsley on top of each helping. Do not add parsley till soup is off the fire, as cooking destroys the vitamin C content of the parsley.

MEAT AND VEGETABLE STEW.

1lb. steak, 3 tablespoons fat, seasoning, tomato sauce, 1 pint water, potatoes, carrots, turnips, parsnips, 1 onion.

Cut the steak into small pieces, dredge thoroughly with flour, and brown in the fat. Wash and dice the vegetables, add them to the steak and water, season to taste, add as much tomato sauce as desired, and cook slowly for 2 hours. Thirty minutes before serving add dumplings made from 1 cup flour, pinch of salt, 2½oz. suet, and mixed with a little cold water to a stiff paste. Drop in spoonfuls on top of the stew.

MUTTON AND KIDNEY HARICOT.

¼lb. kidney, 1½lb. neck of mutton (or chops), onions, carrots, potatoes, 1oz. fat, 1oz. flour, salt and pepper, sufficient water to cover meat.

Chop the kidney finely, trim the fat from the mutton. Flour the mutton and fry in the fat; fry the onions also. Place the meat and the prepared vegetables in a casserole, together with seasoning and sufficient water to cover the meat, and simmer for 2½ hours.

RAGOUT OF BEEF.

2lb. lean raw beef, salt and pepper, flour, 2 or 3 tablespoons fat, 1 onion (chopped), 1 green pepper (chopped), 1 cup chopped celery and leaves, 2 tablespoons chopped parsley, paprika.

Cut the beef in inch cubes and sprinkle with salt, pepper, and flour. Brown well in 2 or 3 tablespoons of fat, and while browning add the onion, green pepper, celery, and parsley. Sprinkle with paprika, add water to cover, put on a lid, and cook slowly for 2½ to 3 hours or until the meat is tender. If the stew is not thick enough, mix 1 to 2 tablespoons of flour to a smooth paste with an equal quantity of cold water. To the paste add several spoonfuls of the stew, then stir the mixture into the rest of the stew and cook until smooth and thickened. Season to taste with salt and pepper, adding, if desired, tomato catsup, or chili sauce, or grated horseradish.

Table of Contents, July, 1945.

British Farmers and War Effort—G. A. Holmes . . 1
Erecting a One-man Limeworks—P. S. Syme 5
Farming in New Zealand: Land Development—P. W. Smallfield 11
New Method of Rearing Queen Bees—A. J. Myers . . 21
Irrigation Practices—G. G. Calder 23
"Sleepy Sickness" and Bearing Trouble in Ewes—A. D. G. M. Laing 37
Weed Seeds in Agricultural Seed—E. O. C. Hyde . . 42
D.D.T.—a New Insecticide—L. J. Dumbleton 45
The Sheep Industry—J. E. Duncan 47
Earthworms—C. J. Hamblyn and A. R. Dingwall . . 55
Radio Broadcasts 58
Studies in Farm Management: A Hakataramea Arable Farm—A. T. Sellwood 59
Reworking of Citrus Trees—A. M. W. Greig 67
National Pig Industry Council 69
Veterinary Notes—Livestock Division 71
Seasonal Notes—Fields Division 75
The Orchard and Vineyard—Horticulture Division . . 79
Guide for the Home Garden—Horticulture Division . . 81
Apiary Notes—Horticulture Division 83
Poultry-keeping Section—Livestock Division 85
Young Farmers' Clubs—S. Freeman, Editor 87
"The Good Neighbour," by Mary 93

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BEAN MEDLEY.

2 cups beans (lima, haricot, or any variety available), onions, carrots, celery, potatoes, tomatoes, salt and pepper, bacon rashers or liver or stewing steak.

Soak the beans overnight. Drain and cook in salted water, together with the sliced stewing steak. (If bacon or liver is used, cut into medium-sized pieces and add later with the vegetables). When the beans are half-cooked add the sliced vegetables and continue simmering at a low heat till the stew is cooked.

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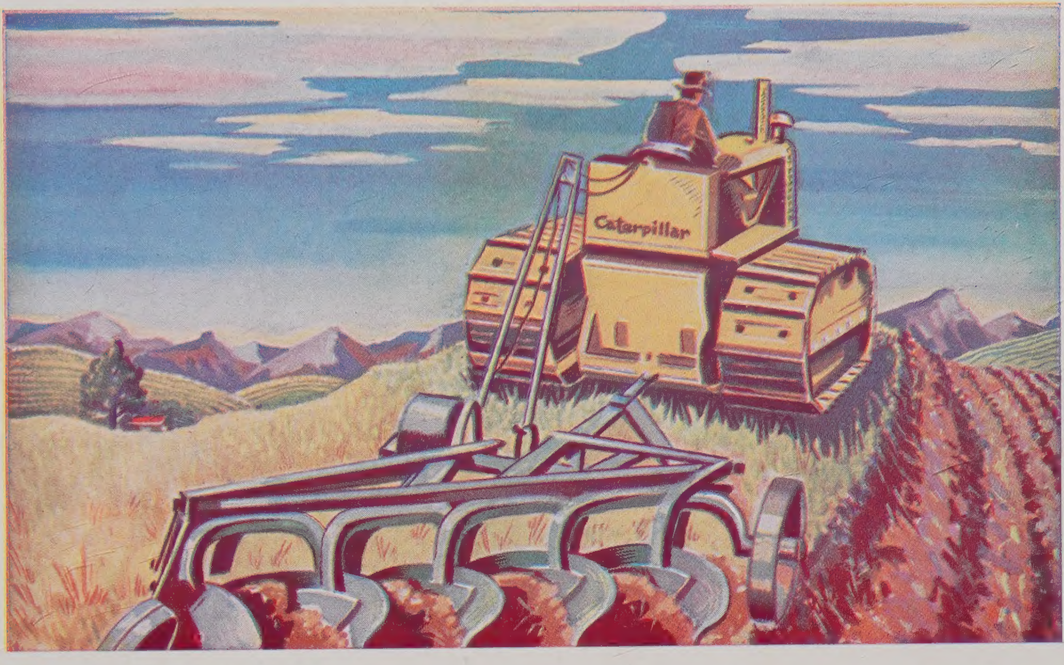

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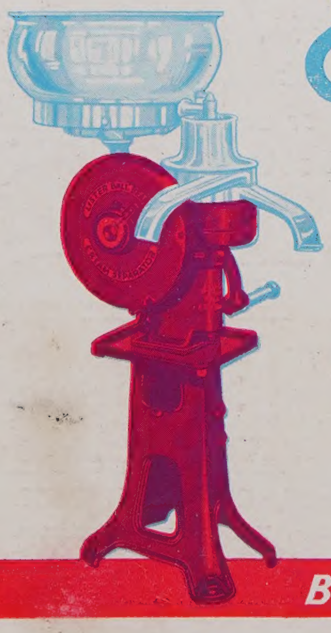

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